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**Information On File as Cited in the
Terrestrial Ecology Assessment Chapter,
Science Integration Team Report,
Interior Columbia Basin Ecosystem Management Project**

Compiled by: Bruce G. Marcot, Lisa Croft, Jeff Jones, M. G. "Sherm" Karl, John Lehmkuhl, S. G. Leonard, Robert Naney, Kurt Nelson, Chris Niwa, Roger Sandquist, Elaine Zieroth

11 September 1995
** for REVIEW DRAFT **

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Preface

The following report was prepared by University scientists through cooperative agreement, project science staff, or contractors as part of the ongoing efforts of the Interior Columbia Basin Ecosystem Management Project, co-managed by the U.S. Forest Service and the Bureau of Land Management. It was prepared for the express purpose of compiling information, reviewing available literature, researching topics related to ecosystems within the Interior Columbia Basin, or exploring relationships among biophysical and economic/social resources.

This report has been reviewed by agency scientists as part of the ongoing ecosystem project. The report may be cited within the primary products produced by the project or it may have served its purposes by furthering our understanding of complex resource issues within the Basin. This report may become the basis for scientific journal articles or technical reports by the USDA Forest Service or USDI Bureau of Land Management. The attached report has not been through all the steps appropriate to final publishing as either a scientific journal article or a technical report.

The following report was prepared by the Army Research Office-Durham (ARO-D) as part of the ongoing efforts of the Army Research Office-Durham (ARO-D) to support the U.S. Army's efforts to develop and test new technologies for the future of land warfare. The report was prepared by the ARO-D and the U.S. Army Research Office-Durham (ARO-D) and is intended to provide information on the current state of the art in the field of land warfare. The report was prepared by the ARO-D and the U.S. Army Research Office-Durham (ARO-D) and is intended to provide information on the current state of the art in the field of land warfare.

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Overall Summary -- Terrestrial Ecology Assessment

Trends in Vegetation Cover Types and Structural Stages

Summary of results: Native grasslands (Fescue-bunchgrass, *Agropyron* bunchgrass), shrublands (big sagebrush), and old single-stratum and multi-strata stages of many forest types, especially lower montane ponderosa pine forests, have declined since historic times. Declines are on both federal and non-federal lands, with most decline on non-federal land. Individual species most associated with these types are many and are listed in tables. Vertebrate "decreasers" of old-growth forests included primary cavity excavators and species with large home ranges.

Assessment of Species Occurrence and Listing Status

Summary of results: Over 35,000 species of macro-organisms are estimated to occur in the assessment area and 14,439 species are known to occur. Micro-organisms are little known and probably tally at least several hundred thousand species. They are critical to ecosystem health and function. We evaluated 11,422 species and explicitly included 1,339 individual species and 143 species groups in a Species-Environment Relations Model. This rich biodiversity is because of the wide variety of habitats, topographic conditions, and prehistoric events within the study area. Some 268 taxa (species, subspecies, or fish stocks) have Federal listing status, including 208 Candidate 2, 33 Candidate 1, 16 endangered, and 11 threatened taxa. FS and BLM list 537 species as sensitive. The Science Integration Team lists 178 species as of particular interest by American Indian tribes. Experts' knowledge levels were greater for plants than vertebrates and greater for vertebrates than invertebrates, which are poorly studied.

Fungi

Summary of results: The fungal flora is poorly known, including effects of management activities. Some species are important to recreational and commercial gatherers. Many kinds of fungi occur, including species with narrow distributions, that fruit after fire, that fruit in dung, and that are mychorrhizal and saprophytic and thus that depend on host plants. Fungi conservation can include protection of type localities in mycological preserves and further study of biology and ecology of species.

Lichens

Summary of results: Lichens play key ecological roles in ecosystems, including contributing mass and nutrients to litter and duff, increasing canopy and soil moisture holding capacity, fixing atmospheric nitrogen, serving as food source for American Indians and animals, and acting as bioindicators for air quality. Lichens are part of microbiotic crusts in rangelands, which protect soils but which are susceptible to damage from livestock grazing. One lichen is listed as a candidate species. The 736 lichen species were divided into 40 functional groups based on ecological relationships. The groups occur on four main substrates: dead organic matter, corticate and decorticate wood, rock, and soil. Forest conservation should include providing clumps of old trees and uneven-aged stands for their legacy of lichens. Lichens are major components of native rangelands and provide critical soil functions, but

Vegetation Survey and Ecological Analysis

Summary of results: The vegetation survey of the study area, which was carried out in 1968, 1969 and 1970, has revealed a high degree of heterogeneity in the distribution of plant species. The results of the analysis of the vegetation data are presented in this paper. The results of the analysis of the vegetation data are presented in this paper. The results of the analysis of the vegetation data are presented in this paper.

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have been threatened from exotic grasses, increased fires, conversion of rangelands, and livestock trampling. Basic lichen surveys and studies of management effects are needed.

Bryophytes

Summary of results: Most bryophytes have wide arctic-alpine and boreal distributions. Others are coastal and north Pacific, or occur in arid environments as part of soil crusts. Three species are endemic. Eleven ecological groups of bryophytes were identified based on substrates. Changes in water quality affect aquatic submersed and wet rock species. Opening of forest canopies affects mycorrhizal species associated with decaying wood and forest humus and duff. Collection may affect some of the humus and duff species. Other species in bogs, fens, and other environments are poorly studied. Dry soil species are critical to soil protection. Many species, at least 268, may be regionally rare, but need inventory to better determine status, especially those in arid habitats, on calcareous rocks, mineralized deposits, peatlands, floodplains, geothermal areas, and isolated canyons. Bryophyte conservation can include training for identification, including bryophytes in field vegetation plot data, and inventory of bryophytes in protected areas.

Vascular Plants

Summary of results: Vascular plants number at least 8000 species, which include at least 154 local or regional endemics. The diversity is from complex biophysical environments along gradients of elevation, bedrock and soils, temperature, and moisture. Native plant communities have declined significantly, prompting concerns for rare species and rare plant communities. Of particular concern are communities affected by grazing, introduction of exotic species, and timber harvesting; examples are bunchgrass grasslands of the Palouse region and low elevation cedar/hemlock old-growth forests. Some 87 plant taxa are of tribal concern for sustained harvestability. Conservation measures can include monitoring rare species and plant communities; off-site collection of pollen, seeds, and rare plants; and protection of key areas of high species rarity, endemism, and diversity.

Invertebrates

Summary of results: No species are listed as threatened, endangered, or Candidate 1; 38 are Candidate 2. FS lists none as sensitive; BLM lists 25. Some 95 terrestrial mollusks need conservation attention singly or as groups; many are confined to calcareous substrates. Invertebrates are critical for many ecosystem functions including detritivory and nutrient cycling. We identify rare and endemic species that bear further watching. Functional roles of invertebrates include: detritivory and nutrient cycling; maintaining soil structure, chemistry, and productivity; wood decomposition; herbivory; pathogenic effects on other organisms as well as control of disease-causing organisms; Invertebrates can make excellent bioindicators of soil and vegetation health. Most arthropods are poorly known; many are unnamed. Arthropod predators may control other invertebrate populations including some defoliator pests, and require a mix of habitat types, down wood, and vegetation substrates. Invertebrate pollinators are critical to maintaining the flora. In grasslands and forests, species groups, particularly herbivores, are important links in food webs and affect

vegetation succession; a few are agricultural or forestry pests. Fire and changes in soil chemistry, especially in range and forest conditions altered from historic structures, directly affect invertebrates. Other management concerns are mechanical and livestock compaction and mixing of soils. Other management activities potentially harmful to desirable invertebrates include overgrazing, some recreation, loss of sphagnum bogs, exotic plants or arthropods, and pesticides. Management should focus on providing a diversity of habitats, maintaining soil structure and soil chemistry, and preventing or eradicating exotics.

Vertebrates

Summary of results: Amphibians require water or moist environments, are susceptible to exotic species, and correlate more with substrates such as down wood or talus than with vegetation types or stages. Amphibians transfer nutrients from aquatic to terrestrial environments, are prey for predators, and contribute major biomass in forest systems. Studies are needed on effects on amphibians from water quality changes, canopy closure, pesticides, livestock grazing, eutrophication, and ultraviolet radiation; and on dispersal requirements and distribution. Reptiles correlate with elevation, aspect, and substrate more than with vegetation. Reptiles are susceptible to dams, off-road vehicles, loss of wetlands, livestock grazing, and fire suppression. Survey techniques for reptiles are needed. Birds are susceptible to management-induced changes in vegetation, especially historic declines in old single-stratum interior ponderosa pine forests and *Agropyron* bunchgrass. Columbian sharp-tailed grouse have particularly declined. Neotropical migrants require conservation or restoration of riparian, old-growth forest, shrubsteppe, grassland, and juniper habitats. Mammals with population or habitat declines include some bats and predators. Some 47 vertebrates are listed as endangered, threatened, or Candidate 2; status of each is discussed. Few locations still contain all top predators.

General Trends of Species Ecological Characteristics

Summary of results: Probably no vertebrates have become regionally extinct in historic times; information on other taxa is lacking. Small-bodied, less widely-vagile species may be at greater risk of declines or local extirpations. Edges of ranges are important for species conservation. A Species-Environment Relations Model annotates species closely associated with environmental conditions affected by management, including forest canopy, mistletoe brooms, dead parts of live trees, trees with exfoliated bark, snags, down wood, litter and duff, fire processes and insect outbreaks, recreation, roads, and trails. This information is useful for management to predict potential effects of activities and identify specific conditions for conservation of species functional groups.

Rangeland Ecology and Grazing Management

Summary of results: Grazing and herbivory are important historic processes disrupted by elimination of paleofauna and wide introduction of livestock. Removal of livestock from riparian, true grasslands, and open conifer-grasslands would aid restoration of native habitat conditions, soil crusts, and riparian-wetlands. Decreased fire occurrence has led to conifer encroachment and increased big sagebrush and shrub density, and increased fires with annual grasses has led to declines in native grasses. Exotics, including cheatgrass, have played

ecological havoc on native grassland systems. Juniper has expanded from fire suppression, reducing Mountain Big Sagebrush and adversely affecting native vegetation communities and soil processes; prescribed fire can slow juniper expansion. Soil (microbiotic) crusts play critical roles in arid land ecology and have been significantly and adversely affected by grazing practices. Riparian grazing has damaged many systems, but can be restored with livestock exclusion or control of grazing season and intensity. Noxious weeds are an increasing problem on rangelands; prevention of new introductions is more cost-effective than eradication. Range degradation has prompted seeding with nonnative forage grasses, which have seriously affected native biodiversity. We identify sundry indicators to disturbance stress for rangelands.

Key Ecological Functions of Species and Processes of Ecological Subsystems

Summary of results: Major ecological functions of species are summarized from the Species-Environment Model data bases. Understanding functions are critical to crafting appropriate ecosystem management guidelines; the fate of individual species is only one facet of terrestrial ecology conservation. Major ecological functions addressed include: species contributing to major biomass; herbivory; nutrient cycling relations; interspecies relations; soil productivity; wood decomposition; and water quality. We advocate using such key ecological functional groups of species rather than identifying individual keystone species; and avoiding use of ecological equivalents among species, as each species provides unique ecological services.

Endemism, Biodiversity, and Natural Areas

Summary of results: Twelve "hot spot" areas with unusually high levels of plant and animal species endemism, rarity, and biodiversity were identified; additional areas were identified separately for plants, invertebrates, and vertebrates. Key areas include southwestern Oregon, Snake River, Columbia River Gorge, and desert steppe in central and southern Washington. Natural areas on federal lands total 11.72 million ha in 26 land allocation categories. Size of natural areas might be suitable for supporting at least small populations of at least 70 percent of vertebrate species.

Biogeography

Summary of results: Broad-scale biogeography of species is poorly studied in the assessment area. We identified some species closely associated with some of the 9 landform classes. Species such as boreal owl appear as disjunct populations because of breaks in distributions of suitable environments or incomplete sampling; smaller and more isolated disjunct populations are likely more susceptible to local declines or extinctions. Locally endemic species or subspecies often are highly habitat-specific, such as Coeur d'Alene salamander. Distributions of local endemics can result from contracted ranges from habitat loss or extirpations, overall scarcity of suitable environments, or other factors. Apparent peripheral, disjunct, and scattered distributions of some species may be an artifact of the location and size of the area of interest. Most Ecological Report Unit had at least some unique species, although many species overlapped several Units. Some species are closely associated with single biophysical factors, although many species are likely correlated with multiple factors.

ecological basis on native grassland systems. Further an expanded list
of vegetation, including wetlands and riparian systems, is necessary
to understand the complex interactions and soil processes. Prescribed
fire and other management practices, such as controlled burning, play
critical roles in maintaining ecological health and have been significantly
altered by grazing practices. Riparian systems have degraded
many systems, but can be restored with livestock exclusion or control of
grazing season and intensity. Wetland systems are an increasing problem
as riparian systems are degraded. Riparian systems are an important
ecosystem. Riparian systems have degraded wetlands with extensive
livestock grazing, which have seriously affected native biodiversity. We
identify several indicators to determine status for riparian systems.

Key Ecological Functions of Species and Processes of Ecological Subsystems

Summary of results: Major ecological functions of species are
determined from the species-environment model. Understanding
functions are critical to creating appropriate management
strategies. The role of individual species is only one factor of
ecosystem ecology management. Major ecological functions addressed
include: species contributing to major biomass, productivity, nutrient
cycling relations, interspecific relations, soil productivity, food
web, and water quality. We address each of these key ecological
functions groups of species within the following individual systems
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Endemic, Biodiversity, and Natural Areas

Summary of results: Twelve "hot spot" areas with unusually high levels
of plant and animal species endemism, rarity, and biodiversity were
identified; additional areas were identified separately for plants,
invertebrates, and vertebrates. Key areas include southwestern Oregon,
Snake River, Columbia River Gorge, and desert steppe in central and
southern Washington. Natural areas on federal lands total 11.75 million
acres in the land allocation categories. Sites of natural areas might be
suitable for supporting at least small populations of at least 10
percent of vertebrate species.

Biodiversity

Summary of results: Broad-scale biogeography of species is poorly
studied in the management area. We identified some species closely
associated with some of the 5 landscape classes. Species such as boreal
owl appear as adjacent populations because of breaks in distributions of
suitable environments or incomplete sampling; smaller and more isolated
populations are likely more susceptible to local extinction or
extinctions. Locally endemic species or subspecies often are highly
habitat-specific, such as Coast d'Alewife salamander. Distributions of
local endemics can result from restricted ranges from habitat loss or
extinction, overall scarcity of suitable environments, or other
factors. Patterns of distribution, abundance, and scattered distributions of
some species may be an artifact of the location and size of the area of
interest. Most ecological reports that had at least some unique species
although many species overlapped several others. Some species are
closely associated with single biophysical factors, although many
species are likely associated with multiple factors.

CONCLUSIONS

Historic and current conditions:

habitats most in decline:

- late-successional forests

- old, open ponderosa pine forests

- native closed shrublands (e.g., big sagebrush)

- native grasslands (*Fescue*-bunchgrass, *Agropyron* bunchgrass)

declines on both non-federal and federal lands; non-federal more extreme

major concerns with rangeland degradation, and exotic plants

Terrestrial biodiversity:

- over 35,000 species of macro-organisms

- ecology and trends of most are unknown

- 17 taxa T&E, 219 C1&C2, 537 FS or BLM sensitive (excluding fish)

- assume USFWS T&E recovery process will provide for those species

To meet goals of ecological integrity:

For conservation of biodiversity:

- some realignment of natural areas to better represent ecosystems
and provide for rare and endemic species

- conserve at least 12 "hot spots" of species rarity, endemism, and richness

- provide for a full array of historic vegetation conditions

For long-term productivity of terrestrial ecosystems:

- realize ecological role of, study, and provide for, soil micro-organisms

- provide for unique assemblages of species and all ecological functions

For maintaining long-term evolutionary potential:

- provide for all populations of species with disjunct distributions

- provide for locally and regionally endemic species, and locally

- endemic subspecies

- protect type localities for rare plants

- in-field and off-site rare plant conservation measures

Need much basic scientific information

- inventories of many fungi, lichens, bryophytes, rare plants

- monitoring of selected rare plant communities

- basic taxonomy (find, name species) of invertebrates

- basic ecology, biology, and ecological roles of many plants, most invertebrates

Use early warning indicators of ecosystem health

- soil crusts, microorganisms, invertebrate herbivores, fungi, lichens, bryophytes

Historic and current conditions:
 Habitat most in decline:
 Late-successional forests
 Old-growth forests and forests
 Native closed woodlands (e.g., old-growth)
 Native grasslands (e.g., old-growth)
 Decline in both old-growth and forested lands and old-growth more extensive
 Major concerns with regional degradation, and native plants
 Technical biodiversity
 Over 25,000 species of native plants
 Ecology and diversity of most are unknown
 It is estimated that 10% of the native (endemic) flora
 Assume that the recovery process will provide for these species

To meet goals of ecological integrity:
 For conservation of biodiversity:
 Some recognition of natural areas in better represent ecosystem
 and provide for rare and endemic species
 Greater focus on "hot spots" of species rarity, endemism, and
 richness
 Greater focus on a full range of habitats, vegetation conditions
 for long-term productivity of terrestrial ecosystems
 Greater recognition of the role of native and endemic plants, soil, and
 organisms
 Provide for native assemblages of species and all ecological
 functions
 For maintaining long-term evolutionary potential:
 Provide for all positions of species with different distributions
 Provide for locally and regionally endemic species, and locally
 endemic subpopulations
 Protect type localities for rare plants
 In-kind and off-site rare plant conservation measures

Need much basic scientific information:
 Inventories of native plants, lichens, mycophytes, rare plants
 Inventories of selected rare plant communities
 Basic taxonomy (and some species) of invertebrates
 Basic ecology, biology, and ecological roles of many plants, most
 invertebrates
 Use early warning indicators of ecosystem health
 Soil science, microclimate, invertebrate behavior, forest, lichens,
 mycophytes

Numbers of taxa (species, subspecies, fish stocks) by Federal listing status, extirpated, and of special interest to American Indian tribes.

Taxonomic classes: NV = nonvascular plants; P = vascular plants; I = invertebrates; F = fish; A = amphibians; R = reptiles; B = birds; M = mammals.

Listing status classes: USFWS = USDI Fish and Wildlife Service; FS = USDA Forest Service; BLM = USDI Bureau of Land Management; C1 = Candidate 1; C2 = Candidate 2; THR = threatened; END = endangered; FPT = Federally proposed threatened; FPE = Federally proposed endangered; FS-S = Forest Service sensitive (in at least one state within the assessment area); BLM-S = Bureau of Land Management sensitive (in at least one state within the assessment area); Joint FS/BLM-S = same species listed by both FS and BLM as sensitive; TRIBAL = species identified by the CRB Science Integration Team as of particular interest to American Indian tribes.

| Class | USFWS | | | | | | FS & BLM | | | | |
|-------|-------|-----|-----|-----|-----|-----|--------------------------------------|-------|--------------------------------|--------------------------------|--------|
| | C1 | C2 | THR | END | FPT | FPE | FS-S | BLM-S | Joint ¹ FS/BLM-S | Total ² FS/BLM-S | TRIBAL |
| NV | | 1 | | | | | 3 | 10 | 1 | 12 | 4 |
| P | 31 | 111 | 1 | 3 | | 1 | 371 | 113 | 45 | 439 | 87 |
| I | | 38 | 1 | 4 | | | | 25 | | 25 | 16 |
| F | 2 | 19 | 5 | 5 | | | [...see Aquatic/Riparian chapter...] | | | | |
| A | | 6 | | | | | 2 | 5 | 2 | 5 | |
| R | | 2 | | | | | 1 | 5 | | 6 | 2 |
| B | | 14 | 3 | 2 | | | 22 | 23 | 12 | 33 | 34 |
| M | | 17 | 1 | 2 | | | 11 | 12 | 6 | 17 | 35 |
| TOTAL | 32 | 208 | 11 | 16 | 0 | 1 | 410 | 193 | 66 | 537 | 178 |
| 268 | | | | | | | | | | | |

¹Joint FS/BLM-S refers to the same species that are listed by both FS and BLM as sensitive.

²Total FS/BLM-S refers to all species listed by either FS or BLM as sensitive.

Assessment of Species Rarity, Endemism, and Biodiversity Hot Spots

Figure. Distribution of hot spots of species rarity and endemism and centers of biodiversity, with Ecological Reporting Unit. These are locations that are particularly rich among plants, invertebrates, and vertebrates.

Figure 1. Distribution of hot spots of species rarity and endemism and centers of biodiversity. With ecological mapping data. These are locations that are particularly rich among plants, invertebrates, and vertebrates.

Appendix xx. Historical and current habitat area for select vascular and non-vascular plant species and groups in the Interior Columbia River Basin based on vegetation types mapped from satellite imagery at a 1-km² pixel resolution.

| Type | Species code | Scientific name | Common Name | Historic habitat (ha) | Current habitat (ha) | Change from historic (%) |
|-----------------|--------------|-------------------------------------|------------------------------|-----------------------|----------------------|--------------------------|
| Bryophyte group | DECWOO | Decayed wood bryophyte | | 6,380,000 | 10,748,000 | 68.5 |
| Bryophyte group | EIPHY | Epiphytic bryophyte | | 6,380,000 | 10,748,000 | 68.5 |
| Bryophyte group | HUMDUF | Humus duff bryophyte | | 7,427,700 | 10,794,200 | 45.3 |
| Bryophyte group | ROCCAL | Rock calcareous bryophyte | | 55,294,500 | 44,445,700 | -19.6 |
| Bryophyte group | ROCOTH | Rock other bryophyte | | 57,677,500 | 57,582,000 | -0.2 |
| Bryophyte group | ROCWET | Rock wet bryophyte | | 261,400 | 184,800 | -29.3 |
| Bryophyte group | SOIALK | Soil alkaline bryophyte | | 1,293,900 | 856,700 | -33.8 |
| Bryophyte group | SOIDRY | Soil dry bryophyte | | 57,677,500 | 57,582,000 | -0.2 |
| Bryophyte group | SOIWET | Soil wet bryophyte | | 55,114,400 | 41,665,200 | -24.4 |
| Lichen sp. | OCEFRU | Oceanic fruticose | Oceanic fruticose | 7,247,900 | 9,464,000 | 30.6 |
| Lichen sp. | TEXSAJ | <i>Texosporium sancti-jacobi</i> | Wovenspored lichens | 14,342,500 | 9,604,000 | -33.0 |
| Lichen group | ASPSPE | Aspen specialist lichens | Aspen specialist | 563,100 | 1,046,200 | 85.8 |
| Lichen group | CALIND | Calcareous indicator lichens | Calcareous rock indicators | 57,416,100 | 57,397,200 | 0.0 |
| Lichen group | CALSTE | Calcareous steppe indicator lichens | Calcareous steppe indicators | 33,212,100 | 32,789,000 | -1.3 |
| Lichen group | CHASNA | Charred snag lichens | Charred snag lichens | 9,577,900 | 13,681,700 | 42.8 |
| Lichen group | EXCNIT | Excess nitrogen indicator lichens | Excess nitrogen indicators | 57,416,100 | 57,397,200 | 0.0 |
| Lichen group | FENPOS | Fencepost lichens | Fencepost lichens | 31,090,500 | 29,971,500 | -3.6 |
| Lichen group | FORAGE | Forage lichens | Forage | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | FRUTRE | Fruticose tree lichens | Fruticose tree lichens | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | LEALIC | Leaf lichens | Leaf lichens | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | METRIC | Metal rich indicator lichens | Metal rich indicators | 55,294,500 | 54,579,700 | -1.3 |
| Lichen group | MOSDIT | Moss and ditritus binders lichens | Moss and ditritus binders | 55,294,500 | 44,445,700 | -19.6 |
| Lichen group | N-FIXE | N-fixing epiphytes lichens | N-fixing epiphytes | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | N-FIXR | N-fixing riparian lichens | N-fixing riparian | 24,744,500 | 25,952,300 | 4.9 |

| | | | | | | |
|--------------|--------|--|----------------------------------|------------|------------|-------|
| Lichen group | NFIXRO | N-fixing rock lichens | N-fixing rock lichens | 55,294,500 | 54,579,700 | -1.3 |
| Lichen group | NFIXSO | N-fixing soil lichens | N-fixing soil lichens | 57,416,100 | 47,263,200 | -17.7 |
| Lichen group | OCEFOR | Oceanic forage lichens | Oceanic forage lichens | 7,247,900 | 9,464,000 | 30.6 |
| Lichen group | OCELEA | Oceanic leaf lichens | Oceanic leaf lichens | 7,247,900 | 9,464,000 | 30.6 |
| Lichen group | OCELOG | Oceanic log lichens | Oceanic log lichens | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | OCETRE | Oceanic tree crust lichens | Oceanic tree crusts | 7,340,700 | 9,821,700 | 33.8 |
| Lichen group | PINLIC | Pin lichens | Pin lichens | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | PIOSOI | Pioneer soil stabilizers lichens | Pioneer soil stabilizers | 57,416,100 | 57,397,200 | 0.0 |
| Lichen group | RIPARI | Riparian lichens | Riparian | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | ROCCRU | Rock crusts lichens | Rock crusts | 55,294,500 | 54,579,700 | -1.3 |
| Lichen group | ROCMAC | Rock macro lichens | Rock macrolichens | 57,416,100 | 57,397,200 | 0.0 |
| Lichen group | ROTLOG | Rotten log and tree base lichens | Rotten log and tree base | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | SEEPAG | Seepage lichens | Seepage rock lichens | 55,294,500 | 44,445,700 | -19.6 |
| Lichen group | SHELED | Sheltered ledges and overhangs lichens | Sheltered ledges and overhangs | 55,294,500 | 44,445,700 | -19.6 |
| Lichen group | SOILIC | Soil lichens | Soil lichens | 31,090,500 | 19,837,500 | -36.2 |
| Lichen group | STESOI | Steppe soil crust lichens | Steppe soil crusts | 33,756,600 | 33,074,200 | -2.0 |
| Lichen group | TRECRU | Tree crusts | Tree crust lichens | 24,744,500 | 25,952,300 | 4.9 |
| Lichen group | URBPOL | Urban pollution-tolerant | Urban pollution tolerant lichens | 57,416,100 | 57,397,200 | 0.0 |
| Lichen group | VAGGRO | Vagrant ground lichens | Vagrant ground lichens | 30,426,200 | 18,671,800 | -38.6 |
| Plant sp. | ALLAAS | <i>Allium aaseae</i> | Aase's onion | 14,521,600 | 9,722,400 | -33.0 |
| Plant sp. | ALLANC | <i>Allium anceps</i> | Two-headed onion | 540,500 | 1,344,100 | 148.7 |
| Plant sp. | ALLBIS | <i>Allium bisceptrum</i> | | 26,897,100 | 24,195,500 | -10.0 |
| Plant sp. | ALLCON | <i>Allium constrictum</i> | Douglas constricted onion | 1,065,200 | 1,111,000 | 4.3 |
| Plant sp. | ALLDIC | <i>Allium dictuon</i> | | 20,415,900 | 13,323,000 | -34.7 |
| Plant sp. | ALLDIC | <i>Allium dictuon</i> | Blue mountain onion | 20,415,900 | 13,323,000 | -34.7 |
| Plant sp. | ALLMAD | <i>Allium madidum</i> | Swamp onion | 7,967,500 | 5,892,600 | -26.0 |
| Plant sp. | ALLNEV | <i>Allium nevii</i> | | 7,967,500 | 16,026,600 | 101.1 |

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|-----------|--------|--|---------------------------|------------|------------|--------|
| Plant sp. | ALLPUN | <i>Allium punctum</i> | | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | ALLROB | <i>Allium robinsonii</i> | Robinson's onion | 269,700 | 13,793,000 | 5014.2 |
| Plant sp. | ALLTOP | <i>Allium tolmiei</i> var. <i>Persimile</i> | Tolmie's onion | 9,330,800 | 8,881,100 | -4.8 |
| Plant sp. | ANTARO | <i>Antennaria aromatica</i> | | 89,600 | 89,400 | -0.2 |
| Plant sp. | ARAFEC | <i>Arabis secunda</i> | Sapphire rockcress | 39,311,100 | 26,124,500 | -33.5 |
| Plant sp. | ARAFLC | <i>Arabis falcifructa</i> | | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | ARTCAW | <i>Artemisia campestris</i> var. <i>Wormskioldii</i> | Northern wormwood | 179,100 | 118,400 | -33.9 |
| Plant sp. | ARTLUE | <i>Artemisia ludoviciana</i> ssp. <i>Estesii</i> | Estes' artemisia | 14,751,800 | 9,764,000 | -33.8 |
| Plant sp. | ASTANS | <i>Astragalus anserinus</i> | Goose creek milkvetch | 6,117,000 | 5,442,400 | -11.0 |
| Plant sp. | ASTAPP | <i>Astragalus applegatei</i> | Applegate's milk-vetch | 1,293,900 | 856,700 | -33.8 |
| Plant sp. | ASTATI | <i>Astragalus atratus</i> var. <i>Inseptus</i> | Mourning milkvetch | 19,919,000 | 13,702,300 | -31.2 |
| Plant sp. | ASTCLA | <i>Astragalus collinus</i> var. <i>Laurentii</i> | Laurence's milk-vetch | 9,759,300 | 3,758,600 | -61.5 |
| Plant sp. | ASTCOL | <i>Astragalus columbianus</i> | Columbia milk-vetch | 15,407,700 | 10,715,000 | -30.5 |
| Plant sp. | ASTDIA | <i>Astragalus diaphanus</i> var. <i>Diaphanus</i> | Transparent milk-vetch | 9,234,600 | 3,991,700 | -56.8 |
| Plant sp. | ASTDID | <i>Astragalus diaphanus</i> var. <i>Diurnis</i> | South john day milk-vetch | 5,254,900 | 2,859,600 | -45.6 |
| Plant sp. | ASTHOW | <i>Astragalus howellii</i> Howell milk-vetch | | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | ASTJES | <i>Aster jessicae</i> | Jessica's aster | 4,776,200 | 1,599,800 | -66.5 |
| Plant sp. | ASTMOL | <i>Aster mollis</i> | | 31,814,600 | 23,758,000 | -25.3 |
| Plant sp. | ASTMUL | <i>Astragalus mulfordiae</i> | Mulford's milk-vetch | 14,521,600 | 9,722,400 | -33.0 |
| Plant sp. | ASTONI | <i>Astragalus oniciformis</i> | Picabo milkvetch | 18,853,800 | 12,591,300 | -33.2 |
| Plant sp. | ASTPAY | <i>Astragalus paysonii</i> | Payson's milkvetch | 11,527,800 | 12,789,200 | 10.9 |
| Plant sp. | ASTPEC | <i>Astragalus peckii</i> | Peck's milk-vetch | 23,941,800 | 18,197,400 | -24.0 |
| Plant sp. | ASTPUS | <i>Astragalus pulsiferae</i> var. <i>Suksdorfii</i> | Ames' milk-vetch | 22,310,000 | 15,496,600 | -30.5 |
| Plant sp. | ASTSCA | <i>Astragalus scaphoides</i> | Bitterroot milkvetch | 1,293,900 | 856,700 | -33.8 |
| Plant sp. | ASTSIN | <i>Astragalus sinuatus</i> | Whited milk-vetch | 19,919,000 | 13,702,300 | -31.2 |
| Plant sp. | ASTSOL | <i>Astragalus solitarius</i> | Weak milk-vetch | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | ASTSTE | <i>Astragalus sterilis</i> | Sterile milk-vetch | 5,805,200 | 3,844,000 | -33.8 |
| Plant sp. | ASTTEG | <i>Astragalus tegetarioides</i> | Bastard kentrophyta | 478,700 | 1,259,800 | 163.2 |
| Plant sp. | ASTTYG | <i>Astragalus tyghensis</i> | Tygh valley milk-vetch | 14,993,000 | 10,959,200 | -26.9 |

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|-----------|--------|--|----------------------------|------------|------------|-------|
| Plant sp. | ASTVEN | <i>Astragalus vexilliflexus</i> var. <i>Nubilus</i> | White cloud milkvetch | 773,200 | 472,200 | -38.9 |
| Plant sp. | ASTYOW | <i>Astragalus yoder-williamsii</i> | Osgoodmountains milkvetch | 6,055,200 | 5,358,100 | -11.5 |
| Plant sp. | BALROS | <i>Balsamorhiza rosea</i> | Rosy balsamroot | 4,983,100 | 2,158,800 | -56.7 |
| Plant sp. | BOTASC | <i>Botrychium ascendens</i> | Upward-lobed moonwort | 211,200 | 486,600 | 130.4 |
| Plant sp. | BOTCRE | <i>Botrychium crenulatum</i> | | 10,540,500 | 12,106,000 | 14.9 |
| Plant sp. | BOTCRE | <i>Botrychium crenulatum</i> | Crenulate moonwort | 10,540,500 | 12,106,000 | 14.9 |
| Plant sp. | BOTCRE | <i>Botrychium crenulatum</i> | Wavy moonwort | 10,540,500 | 12,106,000 | 14.9 |
| Plant sp. | BOTLIN | <i>Botrychium lineare</i> | Linear leaved moonwort | 89,600 | 89,400 | -0.2 |
| Plant sp. | BOTLUN | <i>Botrychium lunaria</i> | Common moonwort | 211,200 | 486,600 | 130.4 |
| Plant sp. | BOTPAR | <i>Botrychium paradoxum</i> | | 11,823,800 | 9,107,800 | -23.0 |
| Plant sp. | BOTPAR | <i>Botrychium paradoxum</i> | Paradox moonwort | 11,823,800 | 9,107,800 | -23.0 |
| Plant sp. | BOTPAR | <i>Botrychium paradoxum</i> | Peculiar moonwort | 11,823,800 | 9,107,800 | -23.0 |
| Plant sp. | BOTPED | <i>Botrychium pedunculosum</i> | Stalked moonwort | 4,905,200 | 2,080,400 | -57.6 |
| Plant sp. | BOTPUM | <i>Botrychium pumicola</i> | Pumice grape-fern | 89,600 | 89,400 | -0.2 |
| Plant sp. | CALLOL | <i>Calochortus longebarbatus</i> var. <i>Longebarbatus</i> | Long-bearded mariposa-lily | 16,833,400 | 8,635,600 | -48.7 |
| Plant sp. | CALLOP | <i>Calochortus longebarbatus</i> var. <i>Peckii</i> | Peck's mariposa-lily | 17,908,800 | 12,861,900 | -28.2 |
| Plant sp. | CALNIT | <i>Calochortus nitidus</i> | Broad-fruit mariposa | 21,481,100 | 14,434,000 | -32.8 |
| Plant sp. | CAMPYG | <i>Camissonia pygmaea</i> | Dwarf evening-primrose | 657,800 | 1,378,200 | 109.5 |
| Plant sp. | CARLED | <i>Carex lenticularis</i> var. <i>Dolia</i> | Goose-grass sedge | 89,600 | 89,400 | -0.2 |
| Plant sp. | CARPAI | <i>Carex parryana</i> ssp. <i>Idaho</i> | Idaho sedge | 171,800 | 95,400 | -44.5 |
| Plant sp. | CASCHL | <i>Castilleja chlorotica</i> | Green-tinged paintbrush | 31,430,600 | 22,830,200 | -27.4 |
| Plant sp. | CASCRY | <i>Castilleja cryptantha</i> | Obscure indian paintbrush | 171,800 | 95,400 | -44.5 |
| Plant sp. | CASPIS | <i>Castilleja pilosa</i> var. <i>Steenensis</i> | Steens mt. Paintbrush | 10,442,300 | 5,787,500 | -44.6 |
| Plant sp. | CASRUB | <i>Castilleja rubida</i> | Purple alpine paintbrush | 89,600 | 89,400 | -0.2 |
| Plant sp. | CHACUS | <i>Chaenactis cusickii</i> <i>Cusick chaenactis</i> | | 5,805,200 | 3,844,000 | -33.8 |
| Plant sp. | CHRPAM | <i>Chrysothamnus parryi</i> ssp. <i>Montanus</i> | Centennial rabbitbrush | 89,600 | 89,400 | -0.2 |
| Plant sp. | CLAUMB | <i>Claytonia umbellata</i> | Umbellate spring beauty | 3,917,900 | 1,047,800 | -73.3 |
| Plant sp. | COLMAZ | <i>Collomia mazama</i> | Mt. Mazama collomia | 4,882,300 | 7,544,900 | 54.5 |

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|-----------|--------|--|--------------------------|------------|------------|-------|
| Plant sp. | COLREN | <i>Collomia renacta</i> | Barren valley collomia | 3,917,900 | 1,047,800 | -73.3 |
| Plant sp. | CYMNIV | <i>Cymopterus nivalis</i> | Hayden's cymopterus | 1,154,800 | 1,200,400 | 3.9 |
| Plant sp. | CYPFAS | <i>Cypripedium fasciculatum</i> | | 12,035,000 | 13,940,600 | 15.8 |
| Plant sp. | CYPFAS | <i>Cypripedium fasciculatum</i> | Clustered lady slipper | 12,035,000 | 13,940,600 | 15.8 |
| Plant sp. | CYPFAS | <i>Cypripedium fasciculatum</i> | Clustered lady's slipper | 12,035,000 | 13,940,600 | 15.8 |
| Plant sp. | CYPFAS | <i>Cypripedium fasciculatum</i> | Clustered lady's-slipper | 12,035,000 | 13,940,600 | 15.8 |
| Plant sp. | DOUIDA | <i>Douglasia idahoensis</i> | Idaho douglasia | 3,179,400 | 3,265,700 | 2.7 |
| Plant sp. | DRATRI | <i>Draba trichocarpa</i> | Stanley's whitlow-grass | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | ERIBAS | <i>Erigeron basalticus</i> | Basalt daisy | 20,619,500 | 12,619,500 | -38.8 |
| Plant sp. | ERICHR | <i>Eriogonum chrysops</i> | Golden buckwheat | 1,065,200 | 1,111,000 | 4.3 |
| Plant sp. | ERICUS | <i>Eriogonum cusickii</i> | Cusick's erigonum | 1,065,200 | 1,111,000 | 4.3 |
| Plant sp. | ERILAC | <i>Erigeron lackschewitzii</i> | Front mountain fleabane | 89,600 | 89,400 | -0.2 |
| Plant sp. | ERILAT | <i>Erigeron latus</i> | Broad fleabane | 15,948,200 | 12,059,100 | -24.4 |
| Plant sp. | ERILEW | <i>Eriogonum lewisii</i> | Lewis's buckwheat | 1,065,200 | 1,111,000 | 4.3 |
| Plant sp. | ERIPRO | <i>Eriogonum prociduum</i> | Prostrate buckwheat | 1,605,700 | 2,455,100 | 52.9 |
| Plant sp. | ERYGRN | <i>Erythronium grandiflorum</i> var. <i>Nudipetalum</i> | | 9,206,400 | 5,827,700 | -36.7 |
| Plant sp. | GRAHET | <i>Gratiola heterosepala</i> | Boggs lake hedge-hyssop | 1,065,200 | 1,111,000 | 4.3 |
| Plant sp. | GRIHOW | <i>Grindelia howellii</i> | Howell's gumweed | 20,415,900 | 13,323,000 | -34.7 |
| Plant sp. | HACCRO | <i>Hackelia cronquistii</i> | Cronquist's stickseed | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | HACVEN | <i>Hackelia venusta</i> | Showy stickseed | 4,024,000 | 7,652,700 | 90.2 |
| Plant sp. | HAPINS | <i>Haplopappus insecticruris</i> | Bugleg goldenweed | 5,841,400 | 2,710,800 | -53.6 |
| Plant sp. | HAPLIA | <i>Haplopappus liatrisformis</i> | Palouse goldenweed | 4,776,200 | 1,599,800 | -66.5 |
| Plant sp. | HAPRAD | <i>Haplopappus radiatus</i> | | 14,521,600 | 9,722,400 | -33.0 |
| Plant sp. | HOWAQU | <i>Howellia aquatilis</i> | Howellia | 8,879,500 | 8,301,800 | -6.5 |
| Plant sp. | HOWAQU | <i>Howellia aquatilis</i> | Water howellia | 8,879,500 | 8,301,800 | -6.5 |
| Plant sp. | IVERHR | <i>Ivesia rhypara</i> var. <i>Rhypara</i> | Grimy ivesia | 20,098,100 | 13,820,700 | -31.2 |
| Plant sp. | IVERHS | <i>Ivesia rhypara</i> var. <i>Shellyi</i> | Shelly's ivesia | 18,800,900 | 11,995,900 | -36.2 |
| Plant sp. | LATGRI | <i>Lathyrus grimesii</i> | Grimes vetchling | 4,511,300 | 2,987,300 | -33.8 |

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|-----------|--------|--|------------------------------|------------|------------|-------|
| Plant sp. | LEPDAV | <i>Lepidium davisii</i> | Davis' peppergrass | 19,919,000 | 13,702,300 | -31.2 |
| Plant sp. | LEPPAP | <i>Lepidium papilliferum</i> | Slick spot peppergrass | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | LEPPUH | <i>Leptodactylon pungens</i> ssp. <i>Hazeliae</i> | Hazel's prickly-phlox | 8,694,100 | 2,647,600 | -69.5 |
| Plant sp. | LESCAC | <i>Lesquerella carinata</i> var. <i>Carinata</i> | | 4,511,300 | 2,987,300 | -33.8 |
| Plant sp. | LESCAL | <i>Lesquerella carinata</i> var. <i>Languida</i> | Keeled bladderpod | 11,886,300 | 6,945,200 | -41.6 |
| Plant sp. | LESHUM | <i>Lesquerella humilis</i> | Few-seeded bladderpod | 1,034,600 | 657,000 | -36.5 |
| Plant sp. | LESPAY | <i>Lesquerella paysonii</i> | Payson's bladderpod | 23,567,600 | 14,145,400 | -40.0 |
| Plant sp. | LESSNO | <i>Lesquerella</i> sp. Nov. (" <i>pulchella</i> ") | Undescribed bladderpod | 8,486,800 | 6,513,000 | -23.3 |
| Plant sp. | LOMERY | <i>Lomatium erythrocarpum</i> | Red-fruited lomatium | 89,600 | 89,400 | -0.2 |
| Plant sp. | LOMGRE | <i>Lomatium greenmanii</i> | | 862,800 | 561,600 | -34.9 |
| Plant sp. | LOMOCH | <i>Lomatium</i> sp. Nov. (" <i>ochocensis</i> ") | | 4,983,100 | 2,158,800 | -56.7 |
| Plant sp. | LOMSUK | <i>Lomatium suksdorfii</i> | Suksdorf's lomatium | 12,926,900 | 7,614,900 | -41.1 |
| Plant sp. | LUISER | <i>Luina serpentina</i> | | 11,885,400 | 6,940,400 | -41.6 |
| Plant sp. | LUPBID | <i>Lupinus biddlei</i> | Biddle's lupine | 18,260,400 | 10,651,800 | -41.7 |
| Plant sp. | LUPCUS | <i>Lupinus cusickii</i> | Prairie lupine | 20,397,700 | 14,962,100 | -26.6 |
| Plant sp. | MECORE | <i>Meconella oregana</i> | White meconella | 548,600 | 289,300 | -47.3 |
| Plant sp. | MENMOL | <i>Mentzelia mollis</i> | Smooth mentzelia | 18,853,800 | 12,591,300 | -33.2 |
| Plant sp. | MENPAC | <i>Mentzelia packardiae</i> | Packard's mentzelia | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | MIMCLI | <i>Mimulus clivicola</i> | | 20,707,200 | 16,212,500 | -21.7 |
| Plant sp. | MIMCLI | <i>Mimulus clivicola</i> | Bank monkey flower | 20,707,200 | 16,212,500 | -21.7 |
| Plant sp. | MIMEVA | <i>Mimulus evanescens</i> | Disappearing monkeyflower | 14,883,000 | 10,948,100 | -26.4 |
| Plant sp. | MIMHYM | <i>Mimulus hymenophyllus</i> | Membrane-leaved monkeyflower | 16,767,700 | 15,145,100 | -9.7 |
| Plant sp. | MIMJEP | <i>Mimulus jepsonii</i> | Jepson's monkeyflower | 16,152,000 | 14,903,300 | -7.7 |
| Plant sp. | MIMJUN | <i>Mimulus jungermannioides</i> | Hepatic monkeyflower | 8,873,200 | 2,766,000 | -68.8 |
| Plant sp. | MIMLAT | <i>Mimulus latidens</i> | Broad-toothed monkeyflower | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | MIMPAT | <i>Mimulus patulus</i> | Stalk-leaved monkeyflower | 11,885,400 | 6,940,400 | -41.6 |
| Plant sp. | MIMPUL | <i>Mimulus pulsiferae</i> | Pulsifer monkeyflower | 16,809,800 | 16,281,500 | -3.1 |
| Plant sp. | MIMPYG | <i>Mimulus pygmaeus</i> | Pygmy monkeyflower | 36,037,400 | 26,685,300 | -26.0 |

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|-----------|--------|--|----------------------------|------------|------------|-------|
| Plant sp. | MIMSUK | <i>Mimulus suksdorfii</i> | Suksdorf's monkey-flower | 34,233,700 | 27,792,200 | -18.8 |
| Plant sp. | MIMTRI | <i>Mimulus tricolor</i> | Three-colored monkeyflower | 12,200,500 | 11,935,200 | -2.2 |
| Plant sp. | MIMWAW | <i>Mimulus washingtonensis</i> var. <i>Washingtonensis</i> | Washington monkeyflower | 35,478,000 | 24,389,500 | -31.3 |
| Plant sp. | MIRBIR | <i>Mirabilis biglovii</i> var. <i>Retrosa</i> | | 1,293,900 | 856,700 | -33.8 |
| Plant sp. | MIRMAC | <i>Mirabilis macfarlanei</i> | Mac farlane's four o'clock | 8,694,100 | 2,647,600 | -69.5 |
| Plant sp. | MIRMAC | <i>Mirabilis macfarlanei</i> | Macfarlane's 4-0-clock | 8,694,100 | 2,647,600 | -69.5 |
| Plant sp. | ORYCON | <i>Oryzopsis contracta</i> | | 19,919,000 | 13,702,300 | -31.2 |
| Plant sp. | ORYCON | <i>Oryzopsis contracta</i> | Ricegrass | 19,919,000 | 13,702,300 | -31.2 |
| Plant sp. | ORYHEN | <i>Oryzopsis hendersonii</i> | Henderson's rice-grass | 4,983,100 | 2,158,800 | -56.7 |
| Plant sp. | ORYHEN | <i>Oryzopsis hendersonii</i> | Henderson's ricegrass | 4,983,100 | 2,158,800 | -56.7 |
| Plant sp. | OXYCAC | <i>Oxytropis campestris</i> var. <i>Columbiana</i> | Columbia crazyweed | 12,743,700 | 7,492,400 | -41.2 |
| Plant sp. | OXYCAW | <i>Oxytropis campestris</i> var. <i>Wanapum</i> | Wanapum crazyweed | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | PAPPYG | <i>Papaver pygmaeum</i> | Alpine poppy | 89,600 | 89,400 | -0.2 |
| Plant sp. | PARKOP | <i>Parnassia kotzebuei</i> var. <i>Pumila</i> | | 89,600 | 89,400 | -0.2 |
| Plant sp. | PENBAR | <i>Penstemon barrettiae</i> | Barrett's penstemon | 20,415,900 | 13,323,000 | -34.7 |
| Plant sp. | PENDAP | <i>Penstemon davidsonii</i> var. <i>Praeteritus</i> | | 23,036,600 | 12,251,600 | -46.8 |
| Plant sp. | PENDEV | <i>Penstemon deustus</i> var. <i>Variabilis</i> | Hot-rock penstemon | 13,684,100 | 6,894,700 | -49.6 |
| Plant sp. | PENGLA | <i>Penstemon glaucinus</i> | Blue-leaved penstemon | 17,951,900 | 16,449,900 | -8.4 |
| Plant sp. | PENJAN | <i>Penstemon janishiae</i> | Janish's penstemon | 23,515,300 | 13,511,400 | -42.5 |
| Plant sp. | PENKIN | <i>Penstemon kingii</i> | | 9,172,800 | 3,907,400 | -57.4 |
| Plant sp. | PENLEM | <i>Penstemon lemhiensis</i> | Lemhi penstemon | 39,449,700 | 26,037,500 | -34.0 |
| Plant sp. | PENNIK | <i>Penstemon nikei</i> | | 14,821,200 | 10,863,800 | -26.7 |
| Plant sp. | PENPEC | <i>Penstemon peckii</i> | Peck's penstemon | 8,146,600 | 6,011,000 | -26.2 |
| Plant sp. | PENPER | <i>Penstemon perpulcher</i> | Very beautiful penstemon | 9,172,800 | 3,907,400 | -57.4 |
| Plant sp. | PENPRA | <i>Penstemon pratensis</i> | | 1,041,800 | 2,306,000 | 121.3 |
| Plant sp. | PENSEO | <i>Penstemon seorsus</i> | Short lobed penstemon | 23,515,300 | 13,511,400 | -42.5 |
| Plant sp. | PENSPA | <i>Penstemon spatulatus</i> | | 7,955,600 | 4,865,500 | -38.8 |
| Plant sp. | PENWIL | <i>Penstemon wilcoxii</i> | Wilcox's penstemon | 16,767,700 | 15,145,100 | -9.7 |

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|-------------|--------|---|--------------------------------|------------|------------|-------|
| Plant sp. | PERERY | <i>Perideridia erythrorhiza</i> | Red-root yampah | 4,948,000 | 1,695,200 | -65.7 |
| Plant sp. | PETCIN | <i>Petrophytum cinerascens</i> | Chelan rockmat | 14,521,600 | 9,722,400 | -33.0 |
| Plant sp. | PHAMIN | <i>Phacelia minutissima</i> | Tiny-flower phacelia | 5,074,400 | 4,033,500 | -20.5 |
| Plant sp. | PHYINM | <i>Physaria integrifolia</i> var. <i>Monticola</i> | | 19,919,000 | 13,702,300 | -31.2 |
| Plant sp. | PLEORE | <i>Pleuropogon oregonus</i> | Oregon semaphore grass | 171,800 | 95,400 | -44.5 |
| Plant sp. | POLPEC | <i>Polemonium pectinatum</i> | Washington polemonium | 28,401,700 | 17,972,700 | -36.7 |
| Plant sp. | RANREC | <i>Ranunculus reconditus</i> | Dalles mt. Buttercup | 4,780,300 | 1,603,900 | -66.4 |
| Plant sp. | RUBBAR | <i>Rubus bartonianus</i> | | 11,907,000 | 6,960,000 | -41.5 |
| Plant sp. | RUBBAR | <i>Rubus bartonianus</i> | Barton berry | 11,907,000 | 6,960,000 | -41.5 |
| Plant sp. | SIDORC | <i>Sidalcea oregana</i> var. <i>Calva</i> | Oregon checkermallow | 563,100 | 1,046,200 | 85.8 |
| Plant sp. | SILSEE | <i>Silene seelyi</i> | Seely's silene | 14,308,100 | 16,249,400 | 13.6 |
| Plant sp. | SILSPA | <i>Silene spaldingii</i> | | 27,107,800 | 28,039,100 | 3.4 |
| Plant sp. | SILSPA | <i>Silene spaldingii</i> | Spalding's catchfly | 27,107,800 | 28,039,100 | 3.4 |
| Plant sp. | SISSAR | <i>Sisyrinchium sarmentosum</i> | Blue-eyed grass | 4,024,000 | 7,652,700 | 90.2 |
| Plant sp. | STACON | <i>Stanleya confertiflora</i> | | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | STEMAL | <i>Stephanomeria malheurensis</i> | Malheur wire-lettuce | 14,342,500 | 9,604,000 | -33.0 |
| Plant sp. | TAUHOO | <i>Tauschia hooveri</i> | Hoover's tuschia | 4,987,200 | 2,162,900 | -56.6 |
| Plant sp. | THEEUC | <i>Thelypodium eucosmum</i> | | 540,500 | 1,344,100 | 148.7 |
| Plant sp. | THEEUC | <i>Thelypodium eucosmum</i> | Arrow-leaf thelypod | 540,500 | 1,344,100 | 148.7 |
| Plant sp. | THEHOS | <i>Thelypodium howellii</i> ssp. <i>Spectabilis</i> | Howell's spectacular thelypody | 1,293,900 | 856,700 | -33.8 |
| Plant sp. | TRIDOU | <i>Trifolium douglasii</i> | | 171,800 | 95,400 | -44.5 |
| Plant sp. | TRIDOU | <i>Trifolium douglasii</i> | Douglas's clover | 171,800 | 95,400 | -44.5 |
| Plant sp. | TRILEI | <i>Trifolium leibergii</i> | Leiberg's clover | 1,065,200 | 1,111,000 | 4.3 |
| Plant sp. | TRIOWY | <i>Trifolium owyheense</i> | Owyhee clover | 1,065,200 | 1,111,000 | 4.3 |
| Plant sp. | TRITHO | <i>Trifolium thompsonii</i> | Thompson's clover | 36,002,700 | 24,156,400 | -32.9 |
| Plant group | ALLGR1 | <i>Allium scablands</i> spp group | | 3,754,300 | 4,782,800 | 27.4 |
| Plant group | ALLGR2 | <i>Allium riparian</i> spp group | | 7,309,900 | 7,978,200 | 9.1 |
| Plant group | BOTGR1 | <i>Botrychium forest</i> spp group | | 39,400 | 391,200 | 892.9 |

| | | | | | |
|-------------|--------|---|------------|------------|-------|
| Plant group | BOTGR3 | <i>Botrychium</i> meadow spp group | 89,600 | 89,400 | -0.2 |
| Plant group | CXDMSA | <i>Carex</i> dry meadow subalpine alpine group | 89,600 | 89,400 | -0.2 |
| Plant group | CXEMSA | <i>Carex</i> ephemeral meadow subalpine alpine group | 89,600 | 89,400 | -0.2 |
| Plant group | CXMMSA | <i>Carex</i> mesic meadow subalpine alpine group | 89,600 | 89,400 | -0.2 |
| Plant group | CXWMSA | <i>Carex</i> wet meadow subalpine alpine group | 89,600 | 89,400 | -0.2 |
| Plant group | MIMGUT | <i>Mimulus</i> <i>guttatus</i> complex | 51,873,900 | 50,927,200 | -1.8 |
| Plant group | MIMHIE | <i>Mimulus</i> hi elev wet habitat group | 15,416,500 | 17,999,700 | 16.8 |
| Plant group | MIMLOW | <i>Mimulus</i> low elevation wet habitat | 54,474,500 | 43,729,800 | -19.7 |
| Plant group | MIMVER | <i>Mimulus</i> vernal group | 42,864,200 | 30,918,700 | -27.9 |
| Plant group | MIMXER | <i>Mimulus</i> xeric group | 52,286,300 | 40,503,400 | -22.5 |
| Plant group | PENACU | <i>Penstemon</i> <i>acuminatus</i> group | 15,157,100 | 7,869,800 | -48.1 |
| Plant group | PENCIN | <i>Penstemon</i> <i>cinicola</i> complex | 21,142,000 | 19,150,400 | -9.4 |
| Plant group | PNDOSS | <i>Penstemon</i> dry open scab sagebrush group | 35,994,100 | 22,391,300 | -37.8 |
| Plant group | PNFMDR | <i>Penstemon</i> foothills to montane dry rocky group | 45,926,500 | 35,821,700 | -22.0 |
| Plant group | PNFMMG | <i>Penstemon</i> foothills to montane meadow group | 30,618,800 | 25,018,900 | -18.3 |

Table PLNTCONC. Geography and trends of, and threats to, plant species of special concern.

This table lists all fungi species of special concern and rates them for population trend and threats to the population. Also listed are the geographic status of each species according to distribution. GEOGRAPHY (endemism) - 1 = local; 2 = regional; 3 = peripheral; 4 = disjunct; 5 = Scattered; 6 = common; TREND - 1 = increasing; 2 = decreasing; 3 = stable; 4 = unknown; THREATS - E = Exotic/ weed invasion; F = change in fire regime; G = livestock grazing; H = change in hydrologic regime; M = mining; R = recreation; T = timber.

Blanks, except in TREND column, mean that no data were readily available. The nearly 2600 common fungal species are not part of this table. This table has only species of special concern; all are considered rare in the assessment area, and some are endemic. Threats to some species are unknown because of lack of knowledge. All mycorrhizal formers are considered potentially threatened by timber management, as they would be impacted to some degree by all silvicultural treatments. The TREND column contains all number 4's for unknown because there is no comprehensive data on population viability of any of the species. These species are considered rare but we know extremely little concerning their biology and ecology. There is an urgent need to direct research on these species.

| <u>TAXON</u> | <u>GEOGRAPHY</u> | <u>TREND</u> | <u>THREATS</u> |
|---|------------------|--------------|----------------|
| <i>Abstoma citrina</i> | 1 | 4 | |
| <i>Abstoma plumbea</i> | 1 | 4 | |
| <i>Abstoma reticulatum</i> | 1 | 4 | |
| <i>Abstoma townei</i> | 1 | 4 | |
| <i>Agaricus albolutescens</i> | | 4 | |
| <i>Albatrellus dispansus</i> | | 4 | |
| <i>Alpova mollis</i> | 4 | 4 | T |
| <i>Amanita alba</i> | | 4 | T |
| <i>Amanita armillariformis</i> | 1 | 4 | T |
| <i>Amanita aurantiasquamosa</i> | 1 | 4 | T |
| <i>Amanita malheurensis</i> | 1 | 4 | T |
| <i>Amanita silvicola</i> | | 4 | T |
| <i>Antrodia alpina</i> | | 4 | |
| <i>Arcangeliella crassa</i> (=tenax) | 4 | 4 | T |
| <i>Balsamia platyspora</i> | 3 | 4 | T |
| <i>Balsamia vulgaris</i> | 3 | 4 | T |
| <i>Battarraea stevensii</i> | 2 | 4 | |
| <i>Boletus barrowsii</i> | 2 | 4 | T |
| <i>Boletus calopus</i> var. <i>frustosus</i> | 2 | 4 | T |
| <i>Bovista aestivalis</i> | | 4 | |
| <i>Bovista californica</i> | | 4 | |
| <i>Bovista dakotensis</i> | | 4 | |
| <i>Bovista leucoderma</i> | | 4 | |
| <i>Byssonectria cartilaginea</i> | 1 | 4 | |
| <i>Calocybe onychina</i> | | 4 | |
| <i>Calvatia bovista</i> | | 4 | |
| <i>Calvatia cretacea</i> | | 4 | |
| <i>Calvatia excipuliformis</i> | | 4 | |
| <i>Calvatia fragilis</i> | | 4 | |
| <i>Calvatia fumosa</i> var. <i>idahoensis</i> | 1 | 4 | |
| <i>Calvatia lloydii</i> | | 4 | |
| <i>Calvatia lycoperdoides</i> | | 4 | |
| <i>Calvatia owyheensis</i> | 1 | 4 | |
| <i>Calvatia pallida</i> | | 4 | |

| | | | |
|--|---|---|---|
| <i>Calvatia tatrensis</i> | | 4 | |
| <i>Calvatia utriformis</i> | | 4 | |
| <i>Cantharellus floccosus</i> var. <i>rainierensis</i> | 1 | 4 | T |
| <i>Cantharellus fumosa</i> | 2 | 4 | T |
| <i>Cantharellus subcretacea</i> | | 4 | T |
| <i>Cenangium piniphilum</i> | 2 | 4 | |
| <i>Chamonixia brevicolumna</i> | 1 | 4 | T |
| <i>Choiromyces alveolatus</i> | 2 | 4 | T |
| <i>Chroogomphus pseudovinicolor</i> | 1 | 4 | T |
| <i>Ciboria alni</i> | | 4 | |
| <i>Clavariadelphus sachalinensis</i> | | 4 | |
| <i>Clavicornia avellanea</i> | | 4 | |
| <i>Clavicornia divaricata</i> | 2 | 4 | |
| <i>Clitocybe caperata</i> | | 4 | |
| <i>Clitocybe deceptiva</i> | | 4 | |
| <i>Clitocybe epigaea</i> | | 4 | |
| <i>Clitocybe gruberi</i> | | 4 | |
| <i>Clitocybe pallidipes</i> | | 4 | |
| <i>Clitocybe payettensis</i> | 1 | 4 | |
| <i>Clitocybe profundidisca</i> | | 4 | |
| <i>Clitocybe pungens</i> | | 4 | |
| <i>Clitocybe varispora</i> | | 4 | |
| <i>Clitocybe multicarpa</i> | | 4 | |
| <i>Coprinus martini</i> | | 4 | |
| <i>Cortinarius albonigrellus</i> | | 4 | T |
| <i>Cortinarius alnetorum</i> | | 4 | T |
| <i>Cortinarius delibutus</i> | | 4 | T |
| <i>Cortinarius fuscoperonatus</i> | | 4 | T |
| <i>Cortinarius glandicolor</i> | | 4 | T |
| <i>Cortinarius hemitrichus</i> f. <i>improcerus</i> | | 4 | T |
| <i>Cortinarius iodes</i> | | 4 | T |
| <i>Cortinarius jubarinus</i> | | 4 | T |
| <i>Cortinarius melinus</i> | | 4 | T |
| <i>Cortinarius mutabilis</i> | | 4 | T |
| <i>Cortinarius parperculus</i> | | 4 | T |
| <i>Cortinarius pholideus</i> | | 4 | T |
| <i>Cortinarius rapaceus</i> | | 4 | T |
| <i>Cortinarius sanguineus</i> | | 4 | T |
| <i>Cortinarius saniosus</i> | | 4 | T |
| <i>Cortinarius sodagnites</i> | | 4 | T |
| <i>Cortinarius variecolor</i> | | 4 | T |
| <i>Cortinarius venetus</i> | | 4 | T |
| <i>Cortinarius vulpicolor</i> | | 4 | T |
| <i>Crepidotus lagenicystis</i> | 4 | 4 | |
| <i>Crepidotus montanensis</i> | 4 | 4 | |
| <i>Crepidotus payettensis</i> | 1 | 4 | |
| <i>Crepidotus ponderosus</i> | | 4 | |
| <i>Crepidotus stratosus</i> | 4 | 4 | |
| <i>Crepidotus sububer</i> | 1 | 4 | |
| <i>Cyathus farcta</i> | | 4 | |
| <i>Cyathus fimbriatus</i> | | 4 | |
| <i>Cyathus olla</i> f. <i>lanatus</i> | 1 | 4 | |
| <i>Cystoderma subpurpureum</i> | | 4 | |
| <i>Dadalea quercina</i> | | 4 | |
| <i>Daedaleopsis confragosa</i> | | 4 | |
| <i>Daedaleopsis steroides</i> | | 4 | |
| <i>Destuntzia subborealis</i> | 1 | 4 | |

| | | | |
|--|---|---|---|
| <i>Entoloma lividoalbum</i> | | 4 | T |
| <i>Fayodia gracilipes</i> | | 4 | |
| <i>Galerina anelligera</i> | 1 | 4 | |
| <i>Galerina borealis</i> | 3 | 4 | |
| <i>Galerina castanescens</i> | 1 | 4 | |
| <i>Galerina diabolissima</i> | 1 | 4 | |
| <i>Galerina fontinalis</i> | 1 | 4 | |
| <i>Galerina fuscobrunnea</i> | 1 | 4 | |
| <i>Galerina mainsii</i> | 1 | 4 | |
| <i>Galerina nordmaniana</i> | 1 | 4 | |
| <i>Galerina payettensis</i> | 1 | 4 | |
| <i>Galerina pseudostylifera</i> | 1 | 4 | |
| <i>Galerina pubescentipes</i> | 1 | 4 | |
| <i>Galerina stylifera</i> var. <i>badia</i> | 1 | 4 | |
| <i>Galerina stylifera</i> var. <i>velosa</i> | 1 | 4 | |
| <i>Galerina triscopa</i> f. <i>longocystis</i> | | 4 | |
| <i>Gastroboletus subalpinus</i> | 2 | 4 | T |
| <i>Gastroboletus turbinatus</i> var. <i>flammeus</i> | 1 | 4 | T |
| <i>Gautieria monitcola</i> | 3 | 4 | T |
| <i>Genabea cerebriformis</i> | 4 | 4 | T |
| <i>Geopora clausa</i> | 4 | 4 | T |
| <i>Geopora sepulta</i> | 3 | 4 | T |
| <i>Gloeophyllum odoratum</i> | | 4 | |
| <i>Gymnomyces ferruginascens</i> | 1 | 4 | T |
| <i>Gymnopilus rufobrunneus</i> | | 4 | |
| <i>Gymnopilus terrestris</i> | | 4 | |
| <i>Hebeloma alpinicola</i> | 1 | 4 | T |
| <i>Hebeloma idahoense</i> | 3 | 4 | T |
| <i>Hebeloma kellogense</i> | 1 | 4 | T |
| <i>Hebeloma latisporum</i> | 3 | 4 | T |
| <i>Hebeloma mesophaeum</i> var. <i>subobscurum</i> | 1 | 4 | T |
| <i>Hebeloma occidentale</i> | 1 | 4 | T |
| <i>Hebeloma oregonense</i> | 1 | 4 | T |
| <i>Hebeloma parcielum</i> | 1 | 4 | T |
| <i>Hebeloma pseudofastibile</i> var. <i>distans</i> | 1 | 4 | T |
| <i>Hebeloma pungens</i> | 1 | 4 | T |
| <i>Hebeloma salmonense</i> | 1 | 4 | T |
| <i>Hebeloma stanleyense</i> | 1 | 4 | T |
| <i>Hebeloma strophosum</i> var. <i>occidentale</i> | 1 | 4 | T |
| <i>Hebeloma vinaceogriseum</i> | | 4 | T |
| <i>Helvella corium</i> | 2 | 4 | T |
| <i>Helvella crassitunicata</i> | 2 | 4 | T |
| <i>Helvella maculata</i> | 2 | 4 | T |
| <i>Henningsomyces candidus</i> | | 4 | |
| <i>Hydnellum cyanopodium</i> | | 4 | T |
| <i>Hydnellum mirabile</i> | | 4 | T |
| <i>Hydnellum pseudocaeruleum</i> | | 4 | T |
| <i>Hydnellum regium</i> | | 4 | T |
| <i>Hydnotrya michaelis</i> | 4 | 4 | T |
| <i>Hydnum indurescens</i> | | 4 | T |
| <i>Hygrophorus albicarneus</i> | 1 | 4 | |
| <i>Hygrophorus albiflavus</i> | 1 | 4 | |
| <i>Hygrophorus burgdorfensis</i> | 1 | 4 | |
| <i>Hygrophorus ellenae</i> | 1 | 4 | |
| <i>Hygrophorus nordmanensis</i> | 1 | 4 | |
| <i>Hygrophorus velatus</i> | 1 | 4 | |
| <i>Hygrophorus vinicolor</i> | 1 | 4 | |

| | | | |
|--|---|---|---|
| <i>Hypoxylon serpens</i> var. <i>macrospora</i> | | 4 | |
| <i>Hysterangium fallax</i> | 2 | 4 | T |
| <i>Inocybe boltoni</i> | | 4 | T |
| <i>Inocybe hystrix</i> | | 4 | T |
| <i>Itajahya galericulata</i> | 1 | 4 | |
| <i>Kuehneromyces carbonicola</i> | | 4 | |
| <i>Lactarius gossypinus</i> | 1 | 4 | T |
| <i>Lactarius payettensis</i> | 3 | 4 | T |
| <i>Lactarius rufus</i> var. <i>parvus</i> ¹ | | 4 | T |
| <i>Leccinum clavatum</i> | | 4 | T |
| <i>Leccinum idahoense</i> | | 4 | T |
| <i>Leccinum incarnatum</i> | | 4 | T |
| <i>Leccinum subfulvum</i> | | 4 | T |
| <i>Leccinum truebloodii</i> | 1 | 4 | T |
| <i>Lentinellus truebloodii</i> | | 4 | |
| <i>Lepiota atrodisca</i> | | 4 | |
| <i>Leptonia sarcitula</i> | | 4 | |
| <i>Leptosphaeria hysterioides</i> | | 4 | |
| <i>Leucopaxillus albissimus</i> var. <i>monticola</i> | | 4 | |
| <i>Leucopaxillus septentrionalis</i> | | 4 | |
| <i>Leucophleps magnata</i> | 4 | 4 | T |
| <i>Lyophyllum brunellae</i> | | 4 | |
| <i>Lyophyllum canescetipes</i> | | 4 | |
| <i>Lyophyllum chamaeleon</i> | | 4 | |
| <i>Lyophyllum chondrocephalum</i> | | 4 | |
| <i>Lyophyllum fistulosum</i> | | 4 | |
| <i>Lyophyllum gracile</i> | | 4 | |
| <i>Lyophyllum investitum</i> | | 4 | |
| <i>Lyophyllum leptosarx</i> | | 4 | |
| <i>Macowanites acris</i> | 1 | 4 | T |
| <i>Macowanites citrinus</i> | 1 | 4 | T |
| <i>Macowanites fulvescens</i> | 1 | 4 | T |
| <i>Macowanites fuscoviolaceus</i> | 1 | 4 | T |
| <i>Macowanites lilacinus</i> | 1 | 4 | T |
| <i>Macowanites nauseosus</i> | 1 | 4 | T |
| <i>Macowanites olidus</i> | 1 | 4 | T |
| <i>Macowanites pinicola</i> | 1 | 4 | T |
| <i>Macowanites pseudometicus</i> | 1 | 4 | T |
| <i>Macowanites subolivaceus</i> | 1 | 4 | T |
| <i>Macowanites subrosaceus</i> | 1 | 4 | T |
| <i>Macowanites vinicolor</i> | 1 | 4 | T |
| <i>Martellia brunnescens</i> | 4 | 4 | T |
| <i>Martellia ellipsospora</i> | 4 | 4 | T |
| <i>Martellia foetens</i> | 4 | 4 | T |
| <i>Martellia fragans</i> | 1 | 4 | T |
| <i>Martellia fulvispora</i> | 1 | 4 | T |
| <i>Martellia monticola</i> | 4 | 4 | T |
| <i>Martellia subalpina</i> | 4 | 4 | T |
| <i>Martellia subochracea</i> | 4 | 4 | T |
| <i>Melanogaster ambiguus</i> | 4 | 4 | T |
| <i>Melanogaster tuberiformis</i> | | | |
| <i>Montagnea candollei</i> | | 4 | |
| <i>Morchella semilibera</i> | | 4 | |
| <i>Mucronella calva</i> var. <i>aggregata</i> | | 4 | |
| <i>Nannfeldtiella aggregata</i> | 2 | 4 | |
| <i>Omphalina chrysophylla</i> var. <i>salmonispora</i> | | 4 | |
| <i>Onygena equina</i> | | 4 | |

| | | | |
|---|---|---|---|
| <i>Ophiobolus prunellae</i> | | 4 | |
| <i>Peniophora decorticans</i> | | 4 | |
| <i>Peziza ammophila</i> | 1 | 4 | |
| <i>Phaeocollybia deceptiva</i> | | 4 | T |
| <i>Phellorinia inquinans</i> | | 4 | |
| <i>Pholiota agglutinata</i> | 1 | 4 | |
| <i>Pholiota atripes</i> | 3 | 4 | |
| <i>Pholiota aurantioflava</i> | 1 | 4 | |
| <i>Pholiota avellaneifolia</i> | 1 | 4 | |
| <i>Pholiota baptistii</i> | 1 | 4 | |
| <i>Pholiota brunnea</i> | 1 | 4 | |
| <i>Pholiota flavida</i> var. <i>graveolens</i> | 1 | 4 | |
| <i>Pholiota flavopallida</i> | 1 | 4 | |
| <i>Pholiota fulvodisca</i> | 1 | 4 | |
| <i>Pholiota fulvozona</i> | 1 | 4 | F |
| <i>Pholiota gruberi</i> | 1 | 4 | |
| <i>Pholiota hiemalis</i> | 1 | 4 | |
| <i>Pholiota humii</i> | 2 | 4 | |
| <i>Pholiota lubrica</i> var. <i>luteifolia</i> | 2 | 4 | |
| <i>Pholiota luteola</i> | 1 | 4 | |
| <i>Pholiota macrocystis</i> | 1 | 4 | |
| <i>Pholiota milleri</i> | 2 | 4 | |
| <i>Pholiota nigripes</i> | 2 | 4 | |
| <i>Pholiota obscura</i> | 2 | 4 | |
| <i>Pholiota occidentalis</i> var. <i>luteifolia</i> | 1 | 4 | |
| <i>Pholiota pallida</i> | 1 | 4 | |
| <i>Pholiota pulchella</i> var. <i>brevipes</i> | 1 | 4 | |
| <i>Pholiota scamboidea</i> | 1 | 4 | |
| <i>Pholiota subechinata</i> | 2 | 4 | |
| <i>Pholiota sublubrica</i> | 2 | 4 | |
| <i>Pholiota subsaponacea</i> | 1 | 4 | F |
| <i>Pholiota tetonensis</i> | 1 | 4 | |
| <i>Pholiota umbilicata</i> | 1 | 4 | |
| <i>Picoa carthusiana</i> | 4 | 4 | T |
| <i>Plectania milleri</i> | 2 | 4 | |
| <i>Polyzellus multiplex</i> | | 4 | T |
| <i>Porphyrellus amylosporus</i> | | 4 | T |
| <i>Protogautieria lutea</i> | 1 | 4 | T |
| <i>Psathyrella abieticola</i> | 2 | 4 | |
| <i>Psathyrella acuticystis</i> | 1 | 4 | |
| <i>Psathyrella annulata</i> | 1 | 4 | |
| <i>Psathyrella areolata</i> | 1 | 4 | |
| <i>Psathyrella boulderensis</i> | 1 | 4 | |
| <i>Psathyrella communis</i> | 4 | 4 | |
| <i>Psathyrella crassulistipes</i> | 1 | 4 | |
| <i>Psathyrella deserticola</i> | 1 | 4 | |
| <i>Psathyrella ellenae</i> | 1 | 4 | |
| <i>Psathyrella equina</i> | 4 | 4 | |
| <i>Psathyrella fragans</i> | 1 | 4 | |
| <i>Psathyrella fulva</i> | 1 | 4 | |
| <i>Psathyrella fuscospora</i> | 1 | 4 | |
| <i>Psathyrella gruberi</i> | 1 | 4 | F |
| <i>Psathyrella idahoensis</i> | 1 | 4 | |
| <i>Psathyrella lepidotoides</i> | 1 | 4 | |
| <i>Psathyrella mesocystis</i> | 1 | 4 | |
| <i>Psathyrella nezperci</i> | 2 | 4 | |
| <i>Psathyrella oregonensis</i> | 1 | 4 | |

| | | | |
|---|---|---|---|
| <i>Psathyrella owyheensis</i> | 1 | 4 | |
| <i>Psathyrella populorum</i> | 1 | 4 | |
| <i>Psathyrella praetenuis</i> | 1 | 4 | |
| <i>Psathyrella pseudolimicola</i> | 2 | 4 | |
| <i>Psathyrella psilocyboides</i> | 4 | 4 | |
| <i>Psathyrella quercicola</i> | 1 | 4 | |
| <i>Psathyrella roothaanensis</i> | 1 | 4 | |
| <i>Psathyrella rufogrisea</i> var. <i>bonnerensis</i> | 1 | 4 | |
| <i>Psathyrella rufogrisea</i> var. <i>riparia</i> | 1 | 4 | |
| <i>Psathyrella salictaria</i> | 1 | 4 | |
| <i>Psathyrella stuntzii</i> | 2 | 4 | |
| <i>Psathyrella subalpina</i> | 1 | 4 | |
| <i>Psathyrella subcaespitosa</i> | 1 | 4 | |
| <i>Psathyrella sublongipes</i> | 1 | 4 | |
| <i>Psathyrella subnuda</i> var. <i>velosa</i> | 1 | 4 | |
| <i>Psathyrella subradicata</i> | 1 | 4 | |
| <i>Psathyrella uskensis</i> | 1 | 4 | |
| <i>Psathyrella variata</i> | 1 | 4 | |
| <i>Psathyrella vesiculocystis</i> | 1 | 4 | |
| <i>Psathyrella wapinitaensis</i> | 4 | 4 | |
| <i>Psathyrella warrenensis</i> | 1 | 4 | |
| <i>Pseudorhizina sphaerospora</i> | 1 | 4 | |
| <i>Psilocybe pelliculosa</i> | | 4 | |
| <i>Psilocybe semilanceata</i> | | 4 | |
| <i>Psilocybe subborealis</i> | | 4 | |
| <i>Pyrenogaster atrogleba</i> | 3 | 4 | T |
| <i>Radiigera fuscogleba</i> | 3 | 4 | T |
| <i>Rhizopogon abietis</i> | 4 | 4 | T |
| <i>Rhizopogon albidus</i> | 2 | 4 | T |
| <i>Rhizopogon albiroseus</i> | 2 | 4 | T |
| <i>Rhizopogon alkalivirens</i> | 2 | 4 | T |
| <i>Rhizopogon alpestris</i> | 1 | 4 | T |
| <i>Rhizopogon anomalus</i> | 1 | 4 | T |
| <i>Rhizopogon arenicola</i> | 1 | 4 | T |
| <i>Rhizopogon argillascens</i> | 2 | 4 | T |
| <i>Rhizopogon avellaneitectus</i> | 2 | 4 | T |
| <i>Rhizopogon bacillisporus</i> | 2 | 4 | T |
| <i>Rhizopogon brunneicolor</i> | 2 | 4 | T |
| <i>Rhizopogon brunneifibrillosus</i> | 2 | 4 | T |
| <i>Rhizopogon butyraceus</i> | 2 | 4 | T |
| <i>Rhizopogon chamaleontinus</i> | 4 | 4 | T |
| <i>Rhizopogon cinerascens</i> | 1 | 4 | T |
| <i>Rhizopogon clavitisporus</i> | 4 | 4 | T |
| <i>Rhizopogon colossus</i> var. <i>colossus</i> | 4 | 4 | T |
| <i>Rhizopogon colossus</i> var. <i>nigromaculatus</i> | 2 | 4 | T |
| <i>Rhizopogon cylindrisporus</i> | 1 | 4 | T |
| <i>Rhizopogon deceptivus</i> | 2 | 4 | T |
| <i>Rhizopogon evadens</i> var. <i>subalpinus</i> | 4 | 4 | T |
| <i>Rhizopogon fallax</i> | 2 | 4 | T |
| <i>Rhizopogon flavofibrillosus</i> 4 | | 4 | T |
| <i>Rhizopogon florencianus</i> | 1 | 4 | T |
| <i>Rhizopogon fragans</i> | 2 | 4 | T |
| <i>Rhizopogon fragmentatus</i> | 1 | 4 | T |
| <i>Rhizopogon griseogleba</i> | 1 | 4 | T |
| <i>Rhizopogon hysterangioides</i> | 1 | 4 | T |
| <i>Rhizopogon inquinatus</i> | 1 | 4 | T |
| <i>Rhizopogon kauffmanii</i> | 2 | 4 | T |

| | | | |
|--|---|---|---|
| <i>Rhizopogon laetiflavus</i> | 1 | 4 | T |
| <i>Rhizopogon luteoalboides</i> | 2 | 4 | T |
| <i>Rhizopogon luteorubescens</i> | 2 | 4 | T |
| <i>Rhizopogon lutescens</i> | 2 | 4 | T |
| <i>Rhizopogon masonae</i> | 1 | 4 | T |
| <i>Rhizopogon milleri</i> | 1 | 4 | T |
| <i>Rhizopogon molligleba</i> | 1 | 4 | T |
| <i>Rhizopogon obscurus</i> | 2 | 4 | T |
| <i>Rhizopogon ochraceisporus</i> | 2 | 4 | T |
| <i>Rhizopogon ochraceobrunnescens</i> | 2 | 4 | T |
| <i>Rhizopogon ochroleucus</i> | 2 | 4 | T |
| <i>Rhizopogon odoratus</i> | 1 | 4 | T |
| <i>Rhizopogon olivaceoluteus</i> | 1 | 4 | T |
| <i>Rhizopogon oswaldii</i> | 2 | 4 | T |
| <i>Rhizopogon parksii</i> | 3 | 4 | T |
| <i>Rhizopogon parvulus</i> | 2 | 4 | T |
| <i>Rhizopogon proximus</i> | 1 | 4 | T |
| <i>Rhizopogon pseudoaffinis</i> | 1 | 4 | T |
| <i>Rhizopogon pseudoalbus</i> | 1 | 4 | T |
| <i>Rhizopogon quericola</i> | 2 | 4 | T |
| <i>Rhizopogon rogersii</i> | 4 | 4 | T |
| <i>Rhizopogon rubescens</i> var. <i>pallidimaculatus</i> | 4 | 4 | T |
| <i>Rhizopogon rudus</i> | 1 | 4 | T |
| <i>Rhizopogon semireticulatus</i> | 2 | 4 | T |
| <i>Rhizopogon semitectus</i> | 2 | 4 | T |
| <i>Rhizopogon sordidus</i> | 4 | 4 | T |
| <i>Rhizopogon subbadius</i> | 2 | 4 | T |
| <i>Rhizopogon subcaerulescens</i> | | | |
| var. <i>viridescens</i> | 1 | 4 | T |
| <i>Rhizopogon subcinnamomeus</i> | 4 | 4 | T |
| <i>Rhizopogon subclavitisporus</i> ⁴ | | 4 | T |
| <i>Rhizopogon subcroceus</i> | 2 | 4 | T |
| <i>Rhizopogon subgelatinosus</i> | 4 | 4 | T |
| <i>Rhizopogon sublateritius</i> | 4 | 4 | T |
| <i>Rhizopogon subolivascens</i> | 1 | 4 | T |
| <i>Rhizopogon subpurpurascens</i> | 2 | 4 | T |
| <i>Rhizopogon subradicatus</i> | 4 | 4 | T |
| <i>Rhizopogon subsalmonius</i> | | | |
| var. <i>griseolilascens</i> | 1 | 4 | T |
| <i>Rhizopogon subsalmonius</i> var. <i>roseitinctus</i> | 1 | 4 | T |
| <i>Rhizopogon subsalmonius</i> var. <i>similis</i> | 2 | 4 | T |
| <i>Rhizopogon udus</i> | 2 | 4 | T |
| <i>Rhizopogon umbrinoviolascent</i> | 2 | 4 | T |
| <i>Rhizopogon variabilisporus</i> | 4 | 4 | T |
| <i>Rhizopogon vesiculosus</i> | 2 | 4 | T |
| <i>Rhizopogon villescens</i> | 4 | 4 | T |
| <i>Rhizopogon zelleri</i> | 4 | 4 | T |
| <i>Rhodoscypa ovilla</i> | 1 | 4 | |
| <i>Russula crenulata</i> | 2 | 4 | T |
| <i>Russula idahoensis</i> | 2 | 4 | T |
| <i>Russula nana</i> | 2 | 4 | T |
| <i>Russula olivacea</i> | 2 | 4 | T |
| <i>Russula subdepallens</i> | 2 | 4 | T |
| <i>Russula velenovskyi</i> | 2 | 4 | T |
| <i>Russula vinosa</i> | | 4 | T |
| <i>Sarcodon fuscoindicus</i> | | 4 | T |
| <i>Sclerogaster xerophila</i> | 4 | 4 | T |

| | | | |
|--|---|---|---|
| <i>Simocybe rubi</i> | | 4 | |
| <i>Sowerbyella imperialis</i> | | 4 | T |
| <i>Sowerbyella rhenana</i> | 1 | 4 | |
| <i>Spathularia flavida</i> var. <i>ramosa</i> | | 4 | |
| <i>Stropharia aeruginosa</i> | | 4 | |
| <i>Suillus imitatus</i> | 2 | 4 | T |
| <i>Suillus pallidiceps</i> | 2 | 4 | T |
| <i>Suillus pseudobrevipes</i> | 2 | 4 | T |
| <i>Tapesia strobicula</i> | | 4 | |
| <i>Tomentella lateritia</i> | | 4 | T |
| <i>Tricholomopsis cystidiosum</i> | | 4 | |
| <i>Truncocolumella citrina</i> var. <i>separabilis</i> | 1 | 4 | T |
| <i>Tuber irradians</i> | 2 | 4 | T |
| <i>Tuber rufum</i> var. <i>nitidum</i> | 5 | 4 | T |
| <i>Tylopilus pseudoscaber</i> | | 4 | T |
| <i>Typhula idahoensis</i> | | 4 | |
| <i>Weraroa coprophila</i> | | 4 | |
| <i>Weraroa nivalis</i> | | 4 | |
| <i>Wolfiporia cocos</i> | | 4 | |
| <i>Wynnella silvicola</i> | | | |

Appendix PLNTHERB. Vascular and nonvascular plant species and species groups using open or closed, grassland/herb structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project. Species were determined from a select list of 219 threatened or endangered, C1 and C2 candidate threatened and endangered species, and special-interest groups.

| Class | Scientific name | Common name | Versatility ^a |
|-------|---|----------------------------|--------------------------|
| P | <i>Aster jessicae</i> | Jessica's aster | 0 |
| P | <i>Carex parryana</i> ssp. <i>idaho</i> | Idaho sedge | 0 |
| P | <i>Castilleja cryptantha</i> | Obscure indian paintbrush | 0 |
| P | <i>Claytonia umbellata</i> | Umbellate spring beauty | 0 |
| P | <i>Collomia renacta</i> | Barren valley collomia | 0 |
| P | <i>Haplopappus liatrifomis</i> | Palouse goldenweed | 0 |
| P | <i>Leptodactylon pungens</i> ssp. <i>hazeliae</i> | Hazel's prickly-phlox | 0 |
| P | <i>Mirabilis macfarlanei</i> | Mac farlane's four o'clock | 0 |
| P | <i>Perideridia erythrorhiza</i> | Red-root yampah | 0 |
| P | <i>Pleuropogon oregonus</i> | Oregon semaphore grass | 0 |
| P | <i>Trifolium douglasii</i> | Douglas's clover | 0 |
| P | <i>Allium aaseae</i> | Aase's onion | 1 |
| P | <i>Astragalus atratus</i> var. <i>inseptus</i> | Mourning milkvetch | 1 |
| P | <i>Astragalus columbianus</i> | Columbia milk-vetch | 1 |
| P | <i>Astragalus diaphanus</i> var. <i>diaphanus</i> | Transparent milk-vetch | 1 |
| P | <i>Astragalus diaphanus</i> var. <i>diurnis</i> | South john day milk-vetch | 1 |
| P | <i>Astragalus howellii</i> | Howell milk-vetch | 1 |
| P | <i>Astragalus mulfordiae</i> | Mulford's milk-vetch | 1 |
| P | <i>Astragalus oniciformis</i> | Picabo milkvetch | 1 |
| P | <i>Astragalus sinuatus</i> | Whited milk-vetch | 1 |
| P | <i>Astragalus solitarius</i> | Weak milk-vetch | 1 |
| P | <i>Draba trichocarpa</i> | Stanley's whitlow-grass | 1 |
| P | <i>Hackelia cronquistii</i> | Cronquist's stickseed | 1 |
| P | <i>Ivesia rhypara</i> var. <i>rhypara</i> | Grimy ivesia | 1 |
| P | <i>Lepidium davisii</i> | Davis' peppergrass | 1 |
| P | <i>Lepidium papilliferum</i> | Slick spot peppergrass | 1 |
| P | <i>Mentzelia mollis</i> | Smooth mentzelia | 1 |
| P | <i>Mentzelia packardiae</i> | Packard's mentzelia | 1 |
| P | <i>Mimulus jungermannioides</i> | Hepatic monkeyflower | 1 |
| P | <i>Mimulus latidens</i> | Broad-toothed monkeyflower | 1 |
| P | <i>Oryzopsis contracta</i> | Ricegrass | 1 |
| P | <i>Oxytropis campestris</i> var. <i>wanapum</i> | Wanapum crazyweed | 1 |
| P | <i>Penstemon perpulcher</i> | Very beautiful penstemon | 1 |
| P | <i>Petrophytum cinerascens</i> | Chelan rockmat | 1 |
| P | <i>Ranunculus reconditus</i> | Dalles mt. Buttercup | 1 |
| P | <i>Stephanomeria malheurensis</i> | Malheur wire-lettuce | 1 |
| L | <i>Texosporium sancti-jacobi</i> | Wovenspored lichens | 1 |
| P | <i>Astragalus collinus</i> var. <i>laurentii</i> | Laurence's milk-vetch | 2 |
| P | <i>Balsamorhiza rosea</i> | Rosy balsamroot | 2 |
| P | <i>Castilleja pilosa</i> var. <i>steenensis</i> | Steens mt. Paintbrush | 2 |

| | | | |
|----|--|------------------------------|---|
| P | <i>Erigeron basalticus</i> | Basalt daisy | 2 |
| P | <i>Erigeron latus</i> | Broad fleabane | 2 |
| P | <i>Haplopappus insecticruris</i> | Bugleg goldenweed | 2 |
| P | <i>Lupinus biddlei</i> | Biddle's lupine | 2 |
| P | <i>Lupinus cusickii</i> | Prairie lupine | 2 |
| P | <i>Mimulus evanescens</i> | Disappearing monkeyflower | 2 |
| P | <i>Oryzopsis hendersonii</i> | Henderson's ricegrass | 2 |
| P | <i>Astragalus tyghensis</i> | Tygh valley milk-vetch | 3 |
| P | <i>Ivesia rhypara</i> var. <i>shellyi</i> | Shelly's ivesia | 3 |
| P | <i>Penstemon deustus</i> var. <i>variabilis</i> | Hot-rock penstemon | 3 |
| P | <i>Penstemon janishiae</i> | Janish's penstemon | 3 |
| P | <i>Penstemon seorsus</i> | Short lobed penstemon | 3 |
| P | <i>Tauschia hooveri</i> | Hoover's tuschia | 3 |
| LG | Vagrant ground lichens | Vagrant ground lichens | 3 |
| LG | Calcareous steppe indicator lichens | Calcareous steppe indicators | 5 |
| LG | Fencepost lichens | Fencepost lichens | 5 |
| LG | Soil lichens | Soil lichens | 5 |
| LG | Steppe soil crust lichens | Steppe soil crusts | 5 |
| P | <i>Allium robinsonii</i> | Robinson's onion | 6 |
| P | <i>Botrychium ascendens</i> | Upward-lobed moonwort | 6 |
| P | <i>Botrychium lunaria</i> | Common moonwort | 6 |
| P | <i>Allium dictuon</i> | Blue mountain onion | 7 |
| P | <i>Artemisia ludoviciana</i> ssp. <i>etesii</i> | Estes' artemisia | 7 |
| P | <i>Calochortus longebarbatus</i> var. <i>longebarbatus</i> | Long-bearded mariposa-lily | 7 |
| P | <i>Calochortus longebarbatus</i> var. <i>peckii</i> | Peck's mariposa-lily | 7 |
| P | <i>Grindelia howellii</i> | Howell's gumweed | 7 |
| P | <i>Lesquerella carinata</i> var. <i>languida</i> | Keeled bladderpod | 7 |
| P | <i>Mimulus hymenophyllus</i> | Membrane-leaved monkeyflower | 7 |
| P | <i>Mimulus patulus</i> | Stalk-leaved monkeyflower | 7 |
| P | <i>Oxytropis campestris</i> var. <i>columbiana</i> | Columbia crazyweed | 7 |
| P | <i>Penstemon barrettiae</i> | Barrett's penstemon | 7 |
| P | <i>Penstemon wilcoxii</i> | Wilcox's penstemon | 7 |
| P | <i>Astragalus peckii</i> | Peck's milk-vetch | 8 |
| P | <i>Astragalus pulsiferae</i> var. <i>suksdorfii</i> | Ames' milk-vetch | 8 |
| P | <i>Botrychium paradoxum</i> | Peculiar moonwort | 8 |
| P | <i>Botrychium pedunculosum</i> | Stalked moonwort | 8 |
| P | <i>Castilleja chlorotica</i> | Green-tinged paintbrush | 8 |
| P | <i>Lesquerella humilis</i> | Few-seeded bladderpod | 8 |
| P | <i>Lesquerella</i> sp. Nov. ("pulchella") | Undescribed bladderpod | 8 |
| P | <i>Arabis fecunda</i> | Sapphire rockcress | 9 |
| P | <i>Calochortus nitidus</i> | Broad-fruit mariposa | 9 |
| P | <i>Lesquerella paysonii</i> | Payson's bladderpod | 9 |

| | | | |
|----|---|----------------------------|----|
| P | <i>Lomatium suksdorfii</i> | Suksdorf's lomatium | 9 |
| P | <i>Mimulus suksdorfii</i> | Suksdorf's monkey-flower | 9 |
| P | <i>Penstemon lemhiensis</i> | Lemhi penstemon | 9 |
| P | <i>Trifolium thompsonii</i> | Thompson's clover | 9 |
| P | <i>Mimulus clivicola</i> | Bank monkey flower | 10 |
| P | <i>Mimulus pygmaeus</i> | Pygmy monkeyflower | 10 |
| P | <i>Mimulus washingtonensis</i> var. <i>washingtonensis</i> | Washington monkeyflower | 10 |
| P | <i>Polemonium pectinatum</i> | Washington polemonium | 10 |
| P | <i>Rubus bartonianus</i> | Barton berry | 10 |
| P | <i>Silene spaldingii</i> | Spalding's catchfly | 10 |
| P | <i>Allium bisceptrum</i> | | 12 |
| P | <i>Allium nevii</i> | | 12 |
| P | <i>Allium punctum</i> | | 12 |
| P | <i>Arabis falcifructa</i> | | 12 |
| P | <i>Aster mollis</i> | | 12 |
| LG | Calcareous indicator lichens | Calcareous rock indicators | 12 |
| P | <i>Erythronium grandiflorum</i> var. <i>nudipetalum</i> | | 12 |
| LG | Excess nitrogen indicator lichens | Excess nitrogen indicators | 12 |
| P | <i>Haplopappus radiatus</i> | | 12 |
| P | <i>Lomatium</i> sp. Nov. ("ochocensis") | | 12 |
| P | <i>Luina serpentina</i> | | 12 |
| LG | Metal rich indicator lichens | Metal rich indicators | 12 |
| P | <i>Mimulus ampliatus</i> | | 12 |
| PG | <i>Mimulus guttatus</i> complex | | 12 |
| PG | <i>Mimulus</i> low elevation wet habitat | | 12 |
| PG | <i>Mimulus</i> vernal group | | 12 |
| PG | <i>Mimulus</i> xeric group | | 12 |
| LG | Moss and ditritus binders lichens | Moss and ditritus binders | 12 |
| LG | N-fixing rock lichens | N-fixing rock lichens | 12 |
| LG | N-fixing soil lichens | N-fixing soil lichens | 12 |
| PG | <i>Penstemon acuminatus</i> group | | 12 |
| P | <i>Penstemon davidsonii</i> var. <i>praeteritus</i> | | 12 |
| P | <i>Penstemon kingii</i> | | 12 |
| P | <i>Penstemon nikei</i> | | 12 |
| P | <i>Penstemon spatulatus</i> | | 12 |
| P | <i>Physaria integrifolia</i> var. <i>monticola</i> | | 12 |
| LG | Pioneer soil stabilizers lichens | Pioneer soil stabilizers | 12 |
| PG | <i>Penstemon</i> dry open scab sagebrush group | | 12 |
| PG | <i>Penstemon</i> foothills to montane dry rocky group | | 12 |

| | | | |
|----|--|----------------------------------|----|
| PG | <i>Penstemon</i> foothills to montane meadow group | | 12 |
| BG | Rock calcareous bryophyte | | 12 |
| LG | Rock crusts lichens | Rock crusts | 12 |
| LG | Rock macro lichens | Rock macrolichens | 12 |
| BG | Rock other bryophyte | | 12 |
| BG | Rock wet bryophyte | | 12 |
| LG | Seepage lichens | Seepage rock lichens | 12 |
| LG | Sheltered ledges and overhangs lichens | Sheltered ledges and overhangs | 12 |
| BG | Soil dry bryophyte | | 12 |
| BG | Soil wet bryophyte | | 12 |
| P | <i>Stanleya confertiflora</i> | | 12 |
| LG | Urban pollution-tolerant | Urban pollution tolerant lichens | 12 |

^a B=bryophyte; BG=bryophyte group; L=lichen; LG=lichen group; P=plant species; PG = plant group.

^b - Versatility rating denotes the number of other structural stages used by the species (11 maximum).

| | | | |
|-----|------------------------------|---------------------|---|
| 1 | <i>Antennaria dioica</i> | Common antwort | 0 |
| 2 | <i>Antennaria racemosa</i> | Hayden's antwort | 0 |
| 3 | <i>Antennaria parvifolia</i> | Walden antwort | 0 |
| 4 | <i>Antennaria racemosa</i> | Quick's antwort | 0 |
| 5 | <i>Antennaria racemosa</i> | Frank's antwort | 0 |
| 6 | <i>Antennaria racemosa</i> | Levin's antwort | 0 |
| 7 | <i>Antennaria racemosa</i> | Woods Lake antwort | 0 |
| 8 | <i>Antennaria racemosa</i> | Grinnell antwort | 0 |
| 9 | <i>Antennaria racemosa</i> | Red-fruited antwort | 0 |
| 10 | <i>Antennaria racemosa</i> | Alpine poppy | 0 |
| 11 | <i>Antennaria racemosa</i> | Swell's antwort | 0 |
| 12 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 13 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 14 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 15 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 16 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 17 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 18 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 19 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 20 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 21 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 22 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 23 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 24 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 25 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 26 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 27 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 28 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 29 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 30 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 31 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 32 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 33 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 34 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 35 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 36 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 37 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 38 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 39 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 40 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 41 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 42 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 43 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 44 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 45 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 46 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 47 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 48 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 49 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 50 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 51 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 52 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 53 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 54 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 55 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 56 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 57 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 58 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 59 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 60 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 61 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 62 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 63 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 64 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 65 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 66 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 67 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 68 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 69 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 70 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 71 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 72 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 73 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 74 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 75 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 76 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 77 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 78 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 79 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 80 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 81 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 82 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 83 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 84 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 85 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 86 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 87 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 88 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 89 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 90 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 91 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 92 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 93 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 94 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 95 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 96 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 97 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 98 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 99 | <i>Antennaria racemosa</i> | Antwort | 0 |
| 100 | <i>Antennaria racemosa</i> | Antwort | 0 |

Appendix PLNTSHRB. Vascular and nonvascular plant species and species groups using open or closed, low-medium shrub structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project. Species were determined from a select list of 219 threatened or endangered, C1 and C2 candidate threatened and endangered species, and special-interest groups.

| Class | Scientific name | Common name | Versa- tility ^b |
|-------|---|-----------------------------------|-------------------------------|
| P | <i>Artemisia campestris</i> var. <i>wormskioldii</i> | Northern wormwood | 0 |
| P | <i>Allium constrictum</i> | Douglas constricted onion | 0 |
| P | <i>Astragalus applegatei</i> | Applegate's milk-vetch | 0 |
| P | <i>Astragalus scaphoides</i> | Bitterroot milkvetch | 0 |
| P | <i>Astragalus sterilis</i> | Sterile milk-vetch | 0 |
| P | <i>Botrychium lineare</i> | Linear leaved moonwort | 0 |
| P | <i>Botrychium pumicola</i> | Pumice grape-fern | 0 |
| P | <i>Camissonia pygmaea</i> | Dwarf evening-primrose | 0 |
| P | <i>Carex lenticularis</i> var. <i>dolia</i> | Goose-grass sedge | 0 |
| P | <i>Castilleja rubida</i> | Purple alpine paintbrush | 0 |
| P | <i>Chaenactis cusickii</i> | Cusick chaenactis | 0 |
| P | <i>Chrysothamnus parryi</i> ssp. <i>montanus</i> | Centennial rabbitbrush | 0 |
| P | <i>Cymopterus nivalis</i> | Hayden's cymopterus | 0 |
| P | <i>Eriogonum chrysops</i> | Golden buckwheat | 0 |
| P | <i>Eriogonum cusickii</i> | Cusick's erigonum | 0 |
| P | <i>Erigeron lackschewitzii</i> | Front mountain fleabane | 0 |
| P | <i>Eriogonum lewisii</i> | Lewis's buckwheat | 0 |
| P | <i>Gratiola heterosepala</i> | Boggs lake hedge-hyssop | 0 |
| P | <i>Lathyrus grimesii</i> | Grimes vetchling | 0 |
| P | <i>Lomatium erythrocarpum</i> | Red-fruited lomatium | 0 |
| P | <i>Papaver pygmaeum</i> | Alpine poppy | 0 |
| P | <i>Thelypodium howellii</i> ssp. <i>spectabilis</i> | Howell's spectacular thelypody | 0 |
| P | <i>Trifolium leibergii</i> | Leiberg's clover | 0 |
| P | <i>Trifolium owyheense</i> | Owyhee clover | 0 |
| P | <i>Allium aaseae</i> | Aase's onion | 1 |
| P | <i>Astragalus anserinus</i> | Goose creek milkvetch | 1 |
| P | <i>Astragalus atratus</i> var. <i>inseptus</i> | Mourning milkvetch | 1 |
| P | <i>Astragalus columbianus</i> | Columbia milk-vetch | 1 |
| P | <i>Astragalus howellii</i> | Howell milk-vetch | 1 |
| P | <i>Astragalus mulfordiae</i> | Mulford's milk-vetch | 1 |
| P | <i>Astragalus oniciformis</i> | Picabo milkvetch | 1 |
| P | <i>Astragalus sinuatus</i> | Whited milk-vetch | 1 |
| P | <i>Astragalus solitarius</i> | Weak milk-vetch | 1 |
| P | <i>Astragalus yoder-williamsii</i> | Osgoodmountains milkvetch | 1 |
| P | <i>Draba trichocarpa</i> | Stanley's whitlow-grass | 1 |
| P | <i>Eriogonum prociduum</i> | Prostrate buckwheat | 1 |
| P | <i>Hackelia cronquistii</i> | Cronquist's stickseed | 1 |
| P | <i>Ivesia rhypara</i> var. <i>rhypara</i> | Grimy ivesia | 1 |

| | | | |
|----|--|------------------------------|---|
| P | <i>Lepidium davisii</i> | Davis' peppergrass | 1 |
| P | <i>Lepidium papilliferum</i> | Slick spot peppergrass | 1 |
| P | <i>Mentzelia mollis</i> | Smooth mentzelia | 1 |
| P | <i>Mentzelia packardiae</i> | Packard's mentzelia | 1 |
| P | <i>Mimulus jungermannioides</i> | Hepatic monkeyflower | 1 |
| P | <i>Mimulus latidens</i> | Broad-toothed monkeyflower | 1 |
| P | <i>Oryzopsis contracta</i> | Ricegrass | 1 |
| P | <i>Oxytropis campestris</i> var. wanapum | Wanapum crazyweed | 1 |
| P | <i>Petrophytum cinerascens</i> | Chelan rockmat | 1 |
| P | <i>Stephanomeria malheurensis</i> | Malheur wire-lettuce | 1 |
| L | <i>Texosporium sancti-jacobi</i> | Wovenspored lichens | 1 |
| P | <i>Astragalus collinus</i> var. laurentii | Laurence's milk-vetch | 2 |
| P | <i>Balsamorhiza rosea</i> | Rosy balsamroot | 2 |
| P | <i>Castilleja pilosa</i> var. steenensis | Steens mt. Paintbrush | 2 |
| P | <i>Erigeron basalticus</i> | Basalt daisy | 2 |
| P | <i>Erigeron latus</i> | Broad fleabane | 2 |
| P | <i>Haplopappus insecticruris</i> | Bugleg goldenweed | 2 |
| P | <i>Lupinus biddlei</i> | Biddle's lupine | 2 |
| P | <i>Lupinus cusickii</i> | Prairie lupine | 2 |
| P | <i>Mimulus evanescens</i> | Disappearing monkeyflower | 2 |
| P | <i>Oryzopsis hendersonii</i> | Henderson's ricegrass | 2 |
| P | <i>Astragalus tyghensis</i> | Tygh valley milk-vetch | 3 |
| P | <i>Ivesia rhypara</i> var. Shellyi | Shelly's ivesia | 3 |
| P | <i>Penstemon deustus</i> var. Variabilis | Hot-rock penstemon | 3 |
| P | <i>Penstemon janishiae</i> | Janish's penstemon | 3 |
| P | <i>Penstemon seorsus</i> | Short lobed penstemon | 3 |
| P | <i>Tauschia hooveri</i> | Hoover's tuschia | 3 |
| LG | Vagrant ground lichens | Vagrant ground lichens | 3 |
| P | <i>Phacelia minutissima</i> | Tiny-flower phacelia | 4 |
| LG | Calcareous steppe indicator lichens | Calcareous steppe indicators | 5 |
| LG | Fencepost lichens | Fencepost lichens | 5 |
| LG | Soil lichens | Soil lichens | 5 |
| LG | Steppe soil crust lichens | Steppe soil crusts | 5 |
| P | <i>Allium tolmiei</i> var. persimile | Tolmie's onion | 6 |
| P | <i>Astragalus paysonii</i> | Payson's milkvetch | 6 |
| P | <i>Collomia mazama</i> | Mt. Mazama collomia | 6 |
| P | <i>Douglasia idahoensis</i> | Idaho douglasia | 6 |
| P | <i>Penstemon peckii</i> | Peck's penstemon | 6 |
| P | <i>Artemisia ludoviciana</i> ssp. estesii | Estes' artemisia | 7 |
| LG | Charred snag lichens | Charred snag lichens | 7 |
| P | <i>Mimulus pulsiferae</i> | Pulsifer monkeyflower | 7 |
| P | <i>Penstemon glaucinus</i> | Blue-leaved penstemon | 7 |

| | | | |
|---|---------------------------|-----|--------------------------|
| 1 | Davis' popoalensis | 1 | Leptochloa tenuis |
| 1 | Black spot popoalensis | 2 | Leptochloa papilliformis |
| 1 | Smooth mercurialis | 3 | Mercurialis mollis |
| 1 | Reckard's mercurialis | 4 | Mercurialis paniculata |
| 1 | Hepatic monophyllous | 5 | Minimus japonicus |
| 1 | Broad-leaved monophyllous | 6 | Minimus latifolius |
| 1 | Riccia | 7 | Cypripedium acaule |
| 1 | Wangshu caryophyllus | 8 | Cypripedium acaule var. |
| 1 | Chelan caryophyllus | 9 | Wangshu |
| 1 | Malheur wire-leaved | 10 | Leptochloa ciliolata |
| 1 | Wangshu ciliolata | 11 | Leptochloa ciliolata |
| 1 | Leptochloa ciliolata | 12 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 13 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 14 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 15 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 16 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 17 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 18 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 19 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 20 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 21 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 22 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 23 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 24 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 25 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 26 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 27 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 28 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 29 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 30 | Leptochloa ciliolata |
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| 2 | Wangshu ciliolata | 41 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 42 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 43 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 44 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 45 | Leptochloa ciliolata |
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| 2 | Wangshu ciliolata | 50 | Leptochloa ciliolata |
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| 2 | Wangshu ciliolata | 52 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 53 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 54 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 55 | Leptochloa ciliolata |
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| 2 | Wangshu ciliolata | 57 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 58 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 59 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 60 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 61 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 62 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 63 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 64 | Leptochloa ciliolata |
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| 2 | Wangshu ciliolata | 73 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 74 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 75 | Leptochloa ciliolata |
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| 2 | Wangshu ciliolata | 85 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 86 | Leptochloa ciliolata |
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| 2 | Wangshu ciliolata | 89 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 90 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 91 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 92 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 93 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 94 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 95 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 96 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 97 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 98 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 99 | Leptochloa ciliolata |
| 2 | Wangshu ciliolata | 100 | Leptochloa ciliolata |

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|----|---|----------------------------|----|
| P | <i>Astragalus peckii</i> | Peck's milk-vetch | 8 |
| P | <i>Astragalus pulsiferae</i> var. <i>suksdorfii</i> | Ames' milk-vetch | 8 |
| P | <i>Botrychium paradoxum</i> | Peculiar moonwort | 8 |
| P | <i>Botrychium pedunculosum</i> | Stalked moonwort | 8 |
| P | <i>Castilleja chlorotica</i> | Green-tinged paintbrush | 8 |
| P | <i>Lesquerella humilis</i> | Few-seeded bladderpod | 8 |
| P | <i>Lesquerella</i> sp. Nov. ("pulchella") | Undescribed bladderpod | 8 |
| P | <i>Arabis fecunda</i> | Sapphire rockcress | 9 |
| P | <i>Calochortus nitidus</i> | Broad-fruit mariposa | 9 |
| P | <i>Lesquerella paysonii</i> | Payson's bladderpod | 9 |
| P | <i>Lomatium suksdorfii</i> | Suksdorf's lomatium | 9 |
| P | <i>Mimulus suksdorfii</i> | Suksdorf's monkey-flower | 9 |
| P | <i>Penstemon lemhiensis</i> | Lemhi penstemon | 9 |
| P | <i>Trifolium thompsonii</i> | Thompson's clover | 9 |
| P | <i>Mimulus clivicola</i> | Bank monkey flower | 10 |
| P | <i>Mimulus pygmaeus</i> | Pygmy monkeyflower | 10 |
| P | <i>Mimulus washingtonensis</i> var. <i>washingtonensis</i> | Washington monkeyflower | 10 |
| P | <i>Polemonium pectinatum</i> | Washington polemonium | 10 |
| P | <i>Rubus bartonianus</i> | Barton berry | 10 |
| P | <i>Silene spaldingii</i> | Spalding's catchfly | 10 |
| P | <i>Allium bisceptrum</i> | | 12 |
| P | <i>Allium punctum</i> | | 12 |
| P | <i>Antennaria aromatica</i> | | 12 |
| P | <i>Arabis falcifructa</i> | | 12 |
| P | <i>Aster mollis</i> | | 12 |
| PG | <i>Botrychium meadow</i> spp group | | 12 |
| LG | Calcareous indicator lichens | Calcareous rock indicators | 12 |
| PG | <i>Carex dry meadow</i> subalpine alpine group | | 12 |
| PG | <i>Carex ephemeral meadow</i> subalpine alpine group | | 12 |
| PG | <i>Carex mesic meadow</i> subalpine alpine group | | 12 |
| PG | <i>Carex wet meadow</i> subalpine alpine group | | 12 |
| LG | Excess nitrogen indicator lichens | Excess nitrogen indicators | 12 |
| P | <i>Haplopappus radiatus</i> | | 12 |
| P | <i>Lesquerella carinata</i> var. <i>carinata</i> | | 12 |
| P | <i>Lomatium greenmanii</i> | | 12 |
| P | <i>Lomatium</i> sp. Nov. ("ochocensis") | | 12 |
| LG | Metal rich indicator lichens | Metal rich indicators | 12 |
| PG | <i>Mimulus guttatus</i> complex | | 12 |

| | | | |
|----|---|----------------------------------|----|
| PG | <i>Mimulus</i> hi elev wet habitat group | | 12 |
| PG | <i>Mimulus</i> low elevation wet habitat | | 12 |
| PG | <i>Mimulus</i> vernal group | | 12 |
| PG | <i>Mimulus</i> xeric group | | 12 |
| P | <i>Mirabilis biglovii</i> var. <i>retrosa</i> | | 12 |
| LG | Moss and ditritus binders lichens | Moss and ditritus binders | 12 |
| LG | N-fixing rock lichens | N-fixing rock lichens | 12 |
| LG | N-fixing soil lichens | N-fixing soil lichens | 12 |
| P | <i>Parnassia kotzebuei</i> var. <i>pumila</i> | | 12 |
| PG | <i>Penstemon acuminatus</i> group | | 12 |
| PG | <i>Penstemon cinicola</i> complex | | 12 |
| P | <i>Penstemon davidsonii</i> var. <i>Praeteritus</i> | | 12 |
| P | <i>Penstemon nikei</i> | | 12 |
| P | <i>Penstemon spatulatus</i> | | 12 |
| P | <i>Physaria integrifolia</i> var. <i>monticola</i> | | 12 |
| LG | Pioneer soil stabilizers lichens | Pioneer soil stabilizers | 12 |
| PG | <i>Penstemon</i> dry open scab sagebrush group | | 12 |
| PG | <i>Penstemon</i> foothills to montane dry rocky group | | 12 |
| PG | <i>Penstemon</i> foothills to montane meadow group | | 12 |
| BG | Rock calcareous bryophyte | | 12 |
| LG | Rock crusts lichens | Rock crusts | 12 |
| LG | Rock macro lichens | Rock macrolichens | 12 |
| BG | Rock other bryophyte | | 12 |
| BG | Rock wet bryophyte | | 12 |
| LG | Seepage lichens | Seepage rock lichens | 12 |
| LG | Sheltered ledges and overhangs lichens | Sheltered ledges and overhangs | 12 |
| BG | Soil alkaline bryophyte | | 12 |
| BG | Soil dry bryophyte | | 12 |
| BG | Soil wet bryophyte | | 12 |
| P | <i>Stanleya confertiflora</i> | | 12 |
| LG | Urban pollution-tolerant lichens | Urban pollution tolerant lichens | 12 |

^a - B=bryophyte; BG=bryophyte group; L=lichen; LG=lichen group; P=plant species; PG = plant group.

^b - Versatility rating denotes the number of other structural stages used by the species (11 maximum).

Appendix PLNTOLDF. Vascular and nonvascular plant species and species groups using single- and multi-storied old forest structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project. Species were determined from a select list of 219 threatened or endangered, C1 and C2 candidate threatened or endangered species, and special-interest groups.

| Class | Scientific name | Common name | Versatility* |
|-------|--|----------------------------|--------------|
| P | <i>Astragalus vexilliflexus</i> var. <i>nubilus</i> | White cloud milkvetch | 4 |
| P | <i>Botrychium crenulatum</i> | Wavy moonwort | 4 |
| P | <i>Hackelia venusta</i> | Showy stickseed | 4 |
| P | <i>Howellia aquatilis</i> | Water howellia | 4 |
| P | <i>Sisyrinchium sarmentosum</i> | Blue-eyed grass | 4 |
| P | <i>Allium madidum</i> | Swamp onion | 5 |
| P | <i>Mimulus jepsonii</i> | Jepson's monkeyflower | 5 |
| LG | Oceanic forage lichens | Oceanic forage lichens | 5 |
| L | Oceanic fruticose | Oceanic fruticose | 5 |
| LG | Oceanic leaf lichens | Oceanic leaf lichens | 5 |
| LG | Oceanic tree crust lichens | Oceanic tree crusts | 5 |
| P | <i>Silene seelyi</i> | Seely's silene | 5 |
| P | <i>Allium robinsonii</i> | Robinson's onion | 6 |
| P | <i>Allium tolmiei</i> var. <i>persimile</i> | Tolmie's onion | 6 |
| P | <i>Astragalus paysonii</i> | Payson's milkvetch | 6 |
| P | <i>Botrychium ascendens</i> | Upward-lobed moonwort | 6 |
| P | <i>Botrychium lunaria</i> | Common moonwort | 6 |
| P | <i>Collomia mazama</i> | Mt. Mazama collomia | 6 |
| P | <i>Cypripedium fasciculatum</i> | Clustered lady slipper | 6 |
| P | <i>Douglasia idahoensis</i> | Idaho douglasia | 6 |
| LG | Forage lichens | Forage | 6 |
| LG | Fruticose tree lichens | Fruticose tree lichens | 6 |
| LG | Leaf lichens | Leaf lichens | 6 |
| P | <i>Mimulus tricolor</i> | Three-colored monkeyflower | 6 |
| LG | N-fixing epiphytes lichens | N-fixing epiphytes | 6 |
| LG | N-fixing riparian lichens | N-fixing riparian | 6 |
| LG | Oceanic log lichens | Oceanic log lichens | 6 |
| P | <i>Penstemon peckii</i> | Peck's penstemon | 6 |
| LG | Pin lichens | Pin lichens | 6 |
| LG | Riparian lichens | Riparian | 6 |
| LG | Rotten log and tree base lichens | Rotten log and tree base | 6 |
| LG | Tree crusts | Tree crust lichens | 6 |
| P | <i>Allium dictuon</i> | Blue mountain onion | 7 |
| P | <i>Artemisia ludoviciana</i> ssp. <i>estesii</i> | Estes' artemisia | 7 |
| P | <i>Calochortus longebarbatus</i> var. <i>longebarbatus</i> | long-bearded mariposa- | 7 |
| P | <i>Calochortus longebarbatus</i> var. <i>peckii</i> | Peck's mariposa-lily | 7 |
| LG | Charred snag lichens | Charred snag lichens | 7 |
| P | <i>Grindelia howellii</i> | Howell's gumweed | 7 |

| | | | |
|----|--|------------------------------|----|
| P | <i>Lesquerella carinata</i> var. <i>languida</i> | Keeled bladderpod | 7 |
| P | <i>Mimulus hymenophyllus</i> | Membrane-leaved monkeyflower | 7 |
| P | <i>Mimulus patulus</i> | Stalk-leaved monkeyflower | 7 |
| P | <i>Mimulus pulsiferae</i> | Pulsifer monkeyflower | 7 |
| P | <i>Oxytropis campestris</i> var. <i>columbiana</i> | Columbia crazyweed | 7 |
| P | <i>Penstemon barrettiae</i> | Barrett's penstemon | 7 |
| P | <i>Penstemon glaucinus</i> | Blue-leaved penstemon | 7 |
| P | <i>Penstemon wilcoxii</i> | Wilcox's penstemon | 7 |
| P | <i>Astragalus peckii</i> | Peck's milk-vetch | 8 |
| P | <i>Astragalus pulsiferae</i> var. <i>suksdorfii</i> | Ames' milk-vetch | 8 |
| P | <i>Botrychium paradoxum</i> | Peculiar moonwort | 8 |
| P | <i>Botrychium pedunculatum</i> | Stalked moonwort | 8 |
| P | <i>Castilleja chlorotica</i> | Green-tinged paintbrush | 8 |
| P | <i>Lesquerella humilis</i> | Few-seeded bladderpod | 8 |
| P | <i>Lesquerella</i> sp. Nov. (" <i>pulchella</i> ") | Undescribed bladderpod | 8 |
| P | <i>Arabis fecunda</i> | Sapphire rockcress | 9 |
| P | <i>Calochortus nitidus</i> | Broad-fruit mariposa | 9 |
| P | <i>Lesquerella paysonii</i> | Payson's bladderpod | 9 |
| P | <i>Lomatium suksdorfii</i> | Suksdorf's lomatium | 9 |
| P | <i>Mimulus suksdorfii</i> | Suksdorf's monkey-flower | 9 |
| P | <i>Penstemon lemhiensis</i> | Lemhi penstemon | 9 |
| P | <i>Trifolium thompsonii</i> | Thompson's clover | 9 |
| P | <i>Mimulus clivicola</i> | Bank monkey flower | 10 |
| P | <i>Mimulus pygmaeus</i> | Pygmy monkeyflower | 10 |
| P | <i>Mimulus washingtonensis</i> var. <i>washingtonensis</i> | Washington monkeyflower | 10 |
| P | <i>Polemonium pectinatum</i> | Washington polemonium | 10 |
| P | <i>Rubus bartonianus</i> | Barton berry | 10 |
| P | <i>Silene spaldingii</i> | Spalding's catchfly | 10 |
| P | <i>Allium bisceptrum</i> | | 12 |
| PG | <i>Allium scablands</i> spp group | | 12 |
| PG | <i>Allium riparian</i> spp group | | 12 |
| P | <i>Allium nevii</i> | | 12 |
| P | <i>Aster mollis</i> | | 12 |
| PG | <i>Botrychium forest</i> spp group | | 12 |
| LG | Calcareous indicator lichens | Calcareous rock indicators | 12 |
| BG | Decayed wood bryophyte | | 12 |
| BG | Epiphytic bryophyte | | 12 |
| P | <i>Erythronium grandiflorum</i> var. <i>nudipetalum</i> | 12 | |
| LG | Excess nitrogen indicator lichens | Excess nitrogen indicators | 12 |
| BG | Humus duff bryophyte | | 12 |
| P | <i>Lomatium greenmanii</i> | | 12 |

| | | | |
|----|---|----------------------------------|----|
| P | <i>Luina serpentina</i> | | 12 |
| LG | Metal rich indicator lichens | Metal rich indicators | 12 |
| P | <i>Mimulus ampliatus</i> | | 12 |
| PG | <i>Mimulus guttatus</i> complex | | 12 |
| PG | <i>Mimulus</i> hi elev wet habitat group | | 12 |
| PG | <i>Mimulus</i> low elevation wet habitat | | 12 |
| PG | <i>Mimulus</i> vernal group | | 12 |
| PG | <i>Mimulus</i> xeric group | | 12 |
| LG | Moss and ditritus binders lichens | Moss and ditritus binders | 12 |
| LG | N-fixing rock lichens | N-fixing rock lichens | 12 |
| LG | N-fixing soil lichens | N-fixing soil lichens | 12 |
| PG | <i>Penstemon cinicola</i> complex | | 12 |
| P | <i>Penstemon spatulatus</i> | | 12 |
| LG | Pioneer soil stabilizers lichens | Pioneer soil stabilizers | 12 |
| PG | <i>Penstemon</i> dry open scab sagebrush group | 12 | |
| PG | <i>Penstemon</i> foothills to montane dry rocky group | 12 | |
| PG | <i>Penstemon</i> foothills to montane meadow group | 12 | |
| BG | Rock calcareous bryophyte | | 12 |
| LG | Rock crusts lichens | Rock crusts | 12 |
| LG | Rock macro lichens | Rock macrolichens | 12 |
| BG | Rock other bryophyte | | 12 |
| LG | Seepage lichens | Seepage rock lichens | 12 |
| LG | Sheltered ledges and overhangs lichens | Sheltered ledges and overhangs | 12 |
| BG | Soil dry bryophyte | | 12 |
| BG | Soil wet bryophyte | | 12 |
| LG | Urban pollution-tolerant | Urban pollution tolerant lichens | 12 |

^a - B=bryophyte; BG=bryophyte group; L=lichen; LG=lichen group; P=plant species; PG = plant group.

^b - Versatility rating denotes the number of other structural stages used by the species (11 maximum).

| | | | |
|----|--|--------------|-----|
| 12 | | Salix repens | 7 |
| 12 | | Salix repens | 10 |
| 12 | | Salix repens | 12 |
| 12 | | Salix repens | 14 |
| 12 | | Salix repens | 16 |
| 12 | | Salix repens | 18 |
| 12 | | Salix repens | 20 |
| 12 | | Salix repens | 22 |
| 12 | | Salix repens | 24 |
| 12 | | Salix repens | 26 |
| 12 | | Salix repens | 28 |
| 12 | | Salix repens | 30 |
| 12 | | Salix repens | 32 |
| 12 | | Salix repens | 34 |
| 12 | | Salix repens | 36 |
| 12 | | Salix repens | 38 |
| 12 | | Salix repens | 40 |
| 12 | | Salix repens | 42 |
| 12 | | Salix repens | 44 |
| 12 | | Salix repens | 46 |
| 12 | | Salix repens | 48 |
| 12 | | Salix repens | 50 |
| 12 | | Salix repens | 52 |
| 12 | | Salix repens | 54 |
| 12 | | Salix repens | 56 |
| 12 | | Salix repens | 58 |
| 12 | | Salix repens | 60 |
| 12 | | Salix repens | 62 |
| 12 | | Salix repens | 64 |
| 12 | | Salix repens | 66 |
| 12 | | Salix repens | 68 |
| 12 | | Salix repens | 70 |
| 12 | | Salix repens | 72 |
| 12 | | Salix repens | 74 |
| 12 | | Salix repens | 76 |
| 12 | | Salix repens | 78 |
| 12 | | Salix repens | 80 |
| 12 | | Salix repens | 82 |
| 12 | | Salix repens | 84 |
| 12 | | Salix repens | 86 |
| 12 | | Salix repens | 88 |
| 12 | | Salix repens | 90 |
| 12 | | Salix repens | 92 |
| 12 | | Salix repens | 94 |
| 12 | | Salix repens | 96 |
| 12 | | Salix repens | 98 |
| 12 | | Salix repens | 100 |

1 - Salix repens group; 2 - Salix repens group; 3 - Salix repens group; 4 - Salix repens group; 5 - Salix repens group; 6 - Salix repens group; 7 - Salix repens group; 8 - Salix repens group; 9 - Salix repens group; 10 - Salix repens group; 11 - Salix repens group; 12 - Salix repens group; 13 - Salix repens group; 14 - Salix repens group; 15 - Salix repens group; 16 - Salix repens group; 17 - Salix repens group; 18 - Salix repens group; 19 - Salix repens group; 20 - Salix repens group; 21 - Salix repens group; 22 - Salix repens group; 23 - Salix repens group; 24 - Salix repens group; 25 - Salix repens group; 26 - Salix repens group; 27 - Salix repens group; 28 - Salix repens group; 29 - Salix repens group; 30 - Salix repens group; 31 - Salix repens group; 32 - Salix repens group; 33 - Salix repens group; 34 - Salix repens group; 35 - Salix repens group; 36 - Salix repens group; 37 - Salix repens group; 38 - Salix repens group; 39 - Salix repens group; 40 - Salix repens group; 41 - Salix repens group; 42 - Salix repens group; 43 - Salix repens group; 44 - Salix repens group; 45 - Salix repens group; 46 - Salix repens group; 47 - Salix repens group; 48 - Salix repens group; 49 - Salix repens group; 50 - Salix repens group; 51 - Salix repens group; 52 - Salix repens group; 53 - Salix repens group; 54 - Salix repens group; 55 - Salix repens group; 56 - Salix repens group; 57 - Salix repens group; 58 - Salix repens group; 59 - Salix repens group; 60 - Salix repens group; 61 - Salix repens group; 62 - Salix repens group; 63 - Salix repens group; 64 - Salix repens group; 65 - Salix repens group; 66 - Salix repens group; 67 - Salix repens group; 68 - Salix repens group; 69 - Salix repens group; 70 - Salix repens group; 71 - Salix repens group; 72 - Salix repens group; 73 - Salix repens group; 74 - Salix repens group; 75 - Salix repens group; 76 - Salix repens group; 77 - Salix repens group; 78 - Salix repens group; 79 - Salix repens group; 80 - Salix repens group; 81 - Salix repens group; 82 - Salix repens group; 83 - Salix repens group; 84 - Salix repens group; 85 - Salix repens group; 86 - Salix repens group; 87 - Salix repens group; 88 - Salix repens group; 89 - Salix repens group; 90 - Salix repens group; 91 - Salix repens group; 92 - Salix repens group; 93 - Salix repens group; 94 - Salix repens group; 95 - Salix repens group; 96 - Salix repens group; 97 - Salix repens group; 98 - Salix repens group; 99 - Salix repens group; 100 - Salix repens group.

Table BRYO3. Herbaria housing bryophyte specimens from Columbia River basin, listed by acronym per *Index Herbariorum*. Asterisk (*) indicates herbaria systematically searched for records from study area.

| | |
|--------|--|
| ALTA | University of Alberta, Edmonton |
| BING | State University of New York, Binghamton |
| BM | British Museum (Natural History), London |
| *BSU | Boise State University, Boise |
| *BUF | Buffalo Museum of Science, Buffalo |
| C | Botanical Museum, Copenhagen |
| CANM | Canadian Museum of Nature, Ottawa |
| CAS | California Academy of Sciences, San Francisco |
| COLO | University of Colorado, Boulder |
| CS | Colorado State University, Fort Collins |
| CU | Cornell University, Ithaca |
| DPU | DePauw University, Greencastle |
| DUKE | Duke University, Durham |
| FH | Farlow Herbarium, Harvard University, Cambridge |
| G | Conservatory and Botanical Garden, Geneva |
| GFC | College of Great Falls, Great Falls |
| HSC | Humboldt State University, Arcata |
| IA | University of Iowa, Iowa City |
| *ID | University of Idaho, Moscow |
| K | Botanic Gardens, Kew [now housed at BM] |
| MICH | University of Michigan, Ann Arbor |
| MIL | Milwaukee Public Museum, Milwaukee |
| MO | Missouri Botanical Garden, St. Louis |
| *MONTU | University of Montana, Missoula |
| NICH | Hattori Botanical Laboratory, Nichinan |
| NY | New York Botanical Garden, New York |
| *ORE | of Oregon [now housed at OSC] |
| *OSC | Oregon State University, Corvallis |
| P | National Museum of Natural History, Paris |
| *PSU | Portland State University, Portland |
| *RM | University of Wyoming, Laramie |
| S | Museum of Natural History, Stockholm |
| SMS | Southwest Missouri State University, Springfield |
| SMU | Southern Methodist University, Dallas |
| TENN | University of Tennessee, Knoxville |
| TRTC | University of Toronto, Toronto |
| UAC | University of Calgary, Calgary |
| *UBC | University of British Columbia, Vancouver |
| UCNW | University College of North Wales, Bangor |
| UWSP | University of Wisconsin, Stevens Point |
| *WS | Washington State University, Pullman |
| *WTU | University of Washington, Seattle |
| US | Smithsonian Institution, Washington D.C. |
| UT | University of Utah [now housed at COLO] |

Without acronym: Grand Teton National Park herbarium, Yellowstone National Park herbarium

Personal herbaria: Guy Brassard, Allan Chambers, John Christy, John Davis, Judith Harpel, Patricia Eckel, Barbara Hoisington

Table PLANTX. Number of accessions of rare plant taxa from the Interior Columbia River Basin for which seeds or living collections are maintained at botanic gardens.

| Taxon | Botanic Garden | | |
|---|----------------|--------|-----------|
| | Berry* | Denver | Red Butte |
| Allium aaseae | 1 | | |
| Amsinckia carinata | | 5 | |
| Antennaria arcuata | | 1 | |
| Arabis fecunda | | | 1# |
| Artemisia campestris var. wormskioldii | | 4 | |
| Astragalus applegatei | 4 | | |
| Astragalus diaphanus var. diurnis | | 1 | |
| Astragalus mulfordiae | | 10 | |
| Astragalus peckii | | 2 | |
| Astragalus sinuatus | 6 | | |
| Astragalus solitarius | 3 | | |
| Astragalus sterilis | | 3 | |
| Astragalus tegetarioides | | 3 | |
| Astragalus tyghensis | 3 | | |
| Calochortus longebarbatus var. longebarbatus | | 3 | |
| Castilleja chlorotica | | 3 | |
| Castilleja christii | | | 1# |
| Chaenactis cusickii | | 1 | |
| Colloma mazama | 2 | | |
| Cypripedium fasciculatum | | 1 | |
| Delphinium viridescens | 4 | | |
| Erigeron basalticus | | 1 | |
| Eriogonum argophyllum | | | 1 |
| Eriogonum crosbyae | 3 | | |
| Eriogonum cusickii | | 4 | |
| Eriogonum prociduum | 5 | | |
| Hackelia cronquistii | 12 | | |
| Hackelia venusta | 22 | | |
| Haplopappus radiatus | 10 | | |
| Howellia aquatilis | living plants | | |
| Ivesia rhypara var. rhypara | | 21 | |
| Lepidium davisii | 5 | | |
| Limnanthes floccosa ssp. bellingeriana | | 2 | |
| Lomatium erythrocarpum | 1 | | |
| Lomatium suksdorfii | 5 | | |
| Luina serpentina | 4 | | |
| Lupinus biddlei | 8 | | |
| Mentzelia mollis | 5 | | |
| Menzelia packardiae | 8 | | |
| Mimulus hymenophyllus | 1 | | |
| Mimulus jungermannioides | 3 | | |
| Mimulus pygmaeus | 1 | | |
| Mirabilis macfarlanei | | 39 | |
| Penstemon barrettiae | 33 | | |
| Penstemon peckii | 201 | | |
| Perideridia erythrorhiza | | 7 | |
| Phacelia lenta | 3 | | |
| Pleuropogon oregonus | 4 | | |

| | | | |
|----------------------------|-----|---|--|
| Polemonium pectinatum | 3 | | |
| Primula nevadensis | 1 | | |
| Ranunculus reconditus | 4 | | |
| Rorippa columbiae | 1 | | |
| Senecio ertterae | 9 | | |
| Sidalcea oregana | | | |
| var. calva | 3 | | |
| Silene seelyi | | 4 | |
| Silene spaldingii | 23 | | |
| Stephanomeria malheurensis | 127 | | |
| Tauschia hooveri | 1 | | |
| Thelypodium eucosmum | 2 | | |
| Thelypodium howellii | | | |
| ssp. spectabilis | 2 | | |
| Trifolium leibergii | | 2 | |
| Trifolium owyheense | 5 | | |
| Trifolium thompsonii | | 2 | |

* The number of accessions can indicate many things. In earlier years, some accessions from different plants in a population were accessioned together. Later, each plant from a population received a separate accession number.

Accession is split between the garden and the National Seed Storage Laboratory. May be more than one accession.

Table 4MGTPRACT. Categories of potential wildland management practices, as evaluated in expert panels on invertebrates ecology and management.

FOREST

- I. Site Preparation
 - A. Prescribed burning
 - 1. pile and burn
 - a. mechanical
 - b. hand
 - 2. jackpot
 - 3. broadcast
 - B. Ripping
 - C. Scarification
 - D. Herbicides
- II. Intermediate Entries
 - A. Fertilization
 - 1. N
 - 2. K
 - B. Precommercial thinning
 - C. Pruning
 - D. Vegetation management
 - 1. herbicide
 - 2. mechanical
 - 3. livestock grazing
 - E. Commercial thinning
- III. Regeneration methods
 - A. Evenaged
 - 1. Clearcut
 - 2. Seed tree
 - 3. Shelterwood
 - B. Unevenaged
 - 1. group
 - 2. individual tree
 - C. ground vs. cable
- IV. Other
 - A. Grazing
 - B. Harvesting of special forest products (eg. fungi, firewood)
 - C. Pest management
 - 1. B.t.
 - 2. virus
 - 3. pheromones
 - D. Exotics
 - 1. flora
 - 2. fauna
 - E. Fire control
 - 1. borate
 - 2. backfire
 - 3. exclusion
 - F. Amelioration of pest, fire, flood, wind and volcanic disturbance
 - 1. grass seeding
 - 2. salvage logging
- V. Natural Disturbances
 - A. Drought
 - B. Wildfire
 - 1. groundfire
 - 2. stand replacement
 - C. Insect outbreaks and disease

activity

- 1. bark beetles
- 2. defoliators
- 3. root rot
- 4. mistletoe

RANGE

- I. Grazing
 - A. Grazing systems
 - 1. seasonal
 - 2. deferred
 - 3. rest rotation
 - B. Juniper and sagebrush control
 - 1. mechanical
 - 2. herbicide
 - 3. fire
 - a. prescribed
 - b. wildfire
- II. Other
 - A. Harvesting of special products (eg. fungi, firewood)
 - B. Pest management
 - C. Exotics
 - 1. flora
 - a. herbicidal control
 - b. manual (grubbing)
 - c. biological control (insects, rusts, etc.)
 - d. grass seeding to prevent reinvasion after herbicide treatment.
 - 2. fauna
 - D. Fire control
 - 1. borate
 - 2. backfire
 - 3. exclusion
 - E. Amelioration of pest, fire, flood, wind and volcanic disturbance
- III. Natural Disturbances
 - A. Drought
 - B. Wildfire
 - 1. groundfire
 - 2. stand replacement
 - C. Insect outbreaks and disease activity

CONSIDERATIONS FOR ASSESSMENT

- I. Temporal scale
 - A. immediate <5 yrs

| WILDERNESS | | FOREST | |
|---|--|---|--|
| I. Wilderness | | I. Wilderness | |
| A. Grazing system | | A. Grazing system | |
| 1. seasonal | | 1. seasonal | |
| 2. delayed | | 2. delayed | |
| 3. rest rotation | | 3. rest rotation | |
| B. Timber and watershed control | | B. Timber and watershed control | |
| 1. mechanical | | 1. mechanical | |
| 2. herbicide | | 2. herbicide | |
| 3. fire | | 3. fire | |
| C. prescribed | | C. prescribed | |
| D. wildlife | | D. wildlife | |
| II. Other | | II. Other | |
| A. Harvesting of special products (eg. fungi, liwood) | | A. Harvesting of special products (eg. fungi, liwood) | |
| B. Forest management | | B. Forest management | |
| C. Forest | | C. Forest | |
| 1. clear | | 1. clear | |
| a. herbicide control | | a. herbicide control | |
| b. manual (grubbing) | | b. manual (grubbing) | |
| c. biological control | | c. biological control | |
| (insects, fungi, etc.) | | (insects, fungi, etc.) | |
| d. grass seeding to prevent | | d. grass seeding to prevent | |
| reversion after herbicide treatment | | reversion after herbicide treatment | |
| E. Forest | | E. Forest | |
| 1. forest | | 1. forest | |
| B. Fire control | | B. Fire control | |
| 1. forest | | 1. forest | |
| 2. herbicide | | 2. herbicide | |
| 3. exclusion | | 3. exclusion | |
| F. Restoration of post-fire forest | | F. Restoration of post-fire forest | |
| 1. seed and volcanic disturbance | | 1. seed and volcanic disturbance | |
| III. Natural disturbances | | III. Natural disturbances | |
| A. Drought | | A. Drought | |
| B. Wildlife | | B. Wildlife | |
| 1. groundfire | | 1. groundfire | |
| 2. stand replacement | | 2. stand replacement | |
| C. Insect outbreaks and disease | | C. Insect outbreaks and disease | |
| activity | | activity | |
| CONSIDERATIONS FOR ASSESSMENT | | CONSIDERATIONS FOR ASSESSMENT | |
| 1. Temporal scale | | 1. Temporal scale | |
| 2. Immediate < 5 yrs | | 2. Immediate < 5 yrs | |
| 3. Intermediate 5-20 yrs | | 3. Intermediate 5-20 yrs | |
| 4. Long-term > 20 yrs | | 4. Long-term > 20 yrs | |
| 5. Scale of impact | | 5. Scale of impact | |
| 6. Frequency of occurrence | | 6. Frequency of occurrence | |
| 7. Potential for recovery | | 7. Potential for recovery | |
| 8. Compatibility with other values | | 8. Compatibility with other values | |
| 9. Feasibility of implementation | | 9. Feasibility of implementation | |
| 10. Cost-effectiveness | | 10. Cost-effectiveness | |
| 11. Public acceptance | | 11. Public acceptance | |
| 12. Legal authority | | 12. Legal authority | |
| 13. Institutional support | | 13. Institutional support | |
| 14. Technical expertise | | 14. Technical expertise | |
| 15. Availability of resources | | 15. Availability of resources | |
| 16. Risk of adverse effects | | 16. Risk of adverse effects | |
| 17. Potential for cumulative effects | | 17. Potential for cumulative effects | |
| 18. Potential for synergistic effects | | 18. Potential for synergistic effects | |
| 19. Potential for antagonistic effects | | 19. Potential for antagonistic effects | |
| 20. Potential for compensatory effects | | 20. Potential for compensatory effects | |
| 21. Potential for net benefits | | 21. Potential for net benefits | |
| 22. Potential for net costs | | 22. Potential for net costs | |
| 23. Potential for net zero | | 23. Potential for net zero | |
| 24. Potential for net gain | | 24. Potential for net gain | |
| 25. Potential for net loss | | 25. Potential for net loss | |
| 26. Potential for net benefit-cost ratio | | 26. Potential for net benefit-cost ratio | |
| 27. Potential for net cost-benefit ratio | | 27. Potential for net cost-benefit ratio | |
| 28. Potential for net benefit-loss ratio | | 28. Potential for net benefit-loss ratio | |
| 29. Potential for net loss-gain ratio | | 29. Potential for net loss-gain ratio | |
| 30. Potential for net gain-loss ratio | | 30. Potential for net gain-loss ratio | |
| 31. Potential for net loss-cost ratio | | 31. Potential for net loss-cost ratio | |
| 32. Potential for net cost-gain ratio | | 32. Potential for net cost-gain ratio | |
| 33. Potential for net gain-benefit ratio | | 33. Potential for net gain-benefit ratio | |
| 34. Potential for net benefit-loss ratio | | 34. Potential for net benefit-loss ratio | |
| 35. Potential for net loss-gain ratio | | 35. Potential for net loss-gain ratio | |
| 36. Potential for net gain-loss ratio | | 36. Potential for net gain-loss ratio | |
| 37. Potential for net loss-cost ratio | | 37. Potential for net loss-cost ratio | |
| 38. Potential for net cost-gain ratio | | 38. Potential for net cost-gain ratio | |
| 39. Potential for net gain-benefit ratio | | 39. Potential for net gain-benefit ratio | |
| 40. Potential for net benefit-loss ratio | | 40. Potential for net benefit-loss ratio | |
| 41. Potential for net loss-gain ratio | | 41. Potential for net loss-gain ratio | |
| 42. Potential for net gain-loss ratio | | 42. Potential for net gain-loss ratio | |
| 43. Potential for net loss-cost ratio | | 43. Potential for net loss-cost ratio | |
| 44. Potential for net cost-gain ratio | | 44. Potential for net cost-gain ratio | |
| 45. Potential for net gain-benefit ratio | | 45. Potential for net gain-benefit ratio | |
| 46. Potential for net benefit-loss ratio | | 46. Potential for net benefit-loss ratio | |
| 47. Potential for net loss-gain ratio | | 47. Potential for net loss-gain ratio | |
| 48. Potential for net gain-loss ratio | | 48. Potential for net gain-loss ratio | |
| 49. Potential for net loss-cost ratio | | 49. Potential for net loss-cost ratio | |
| 50. Potential for net cost-gain ratio | | 50. Potential for net cost-gain ratio | |
| 51. Potential for net gain-benefit ratio | | 51. Potential for net gain-benefit ratio | |
| 52. Potential for net benefit-loss ratio | | 52. Potential for net benefit-loss ratio | |
| 53. Potential for net loss-gain ratio | | 53. Potential for net loss-gain ratio | |
| 54. Potential for net gain-loss ratio | | 54. Potential for net gain-loss ratio | |
| 55. Potential for net loss-cost ratio | | 55. Potential for net loss-cost ratio | |
| 56. Potential for net cost-gain ratio | | 56. Potential for net cost-gain ratio | |
| 57. Potential for net gain-benefit ratio | | 57. Potential for net gain-benefit ratio | |
| 58. Potential for net benefit-loss ratio | | 58. Potential for net benefit-loss ratio | |
| 59. Potential for net loss-gain ratio | | 59. Potential for net loss-gain ratio | |
| 60. Potential for net gain-loss ratio | | 60. Potential for net gain-loss ratio | |
| 61. Potential for net loss-cost ratio | | 61. Potential for net loss-cost ratio | |
| 62. Potential for net cost-gain ratio | | 62. Potential for net cost-gain ratio | |
| 63. Potential for net gain-benefit ratio | | 63. Potential for net gain-benefit ratio | |
| 64. Potential for net benefit-loss ratio | | 64. Potential for net benefit-loss ratio | |
| 65. Potential for net loss-gain ratio | | 65. Potential for net loss-gain ratio | |
| 66. Potential for net gain-loss ratio | | 66. Potential for net gain-loss ratio | |
| 67. Potential for net loss-cost ratio | | 67. Potential for net loss-cost ratio | |
| 68. Potential for net cost-gain ratio | | 68. Potential for net cost-gain ratio | |
| 69. Potential for net gain-benefit ratio | | 69. Potential for net gain-benefit ratio | |
| 70. Potential for net benefit-loss ratio | | 70. Potential for net benefit-loss ratio | |
| 71. Potential for net loss-gain ratio | | 71. Potential for net loss-gain ratio | |
| 72. Potential for net gain-loss ratio | | 72. Potential for net gain-loss ratio | |
| 73. Potential for net loss-cost ratio | | 73. Potential for net loss-cost ratio | |
| 74. Potential for net cost-gain ratio | | 74. Potential for net cost-gain ratio | |
| 75. Potential for net gain-benefit ratio | | 75. Potential for net gain-benefit ratio | |
| 76. Potential for net benefit-loss ratio | | 76. Potential for net benefit-loss ratio | |
| 77. Potential for net loss-gain ratio | | 77. Potential for net loss-gain ratio | |
| 78. Potential for net gain-loss ratio | | 78. Potential for net gain-loss ratio | |
| 79. Potential for net loss-cost ratio | | 79. Potential for net loss-cost ratio | |
| 80. Potential for net cost-gain ratio | | 80. Potential for net cost-gain ratio | |
| 81. Potential for net gain-benefit ratio | | 81. Potential for net gain-benefit ratio | |
| 82. Potential for net benefit-loss ratio | | 82. Potential for net benefit-loss ratio | |
| 83. Potential for net loss-gain ratio | | 83. Potential for net loss-gain ratio | |
| 84. Potential for net gain-loss ratio | | 84. Potential for net gain-loss ratio | |
| 85. Potential for net loss-cost ratio | | 85. Potential for net loss-cost ratio | |
| 86. Potential for net cost-gain ratio | | 86. Potential for net cost-gain ratio | |
| 87. Potential for net gain-benefit ratio | | 87. Potential for net gain-benefit ratio | |
| 88. Potential for net benefit-loss ratio | | 88. Potential for net benefit-loss ratio | |
| 89. Potential for net loss-gain ratio | | 89. Potential for net loss-gain ratio | |
| 90. Potential for net gain-loss ratio | | 90. Potential for net gain-loss ratio | |
| 91. Potential for net loss-cost ratio | | 91. Potential for net loss-cost ratio | |
| 92. Potential for net cost-gain ratio | | 92. Potential for net cost-gain ratio | |
| 93. Potential for net gain-benefit ratio | | 93. Potential for net gain-benefit ratio | |
| 94. Potential for net benefit-loss ratio | | 94. Potential for net benefit-loss ratio | |
| 95. Potential for net loss-gain ratio | | 95. Potential for net loss-gain ratio | |
| 96. Potential for net gain-loss ratio | | 96. Potential for net gain-loss ratio | |
| 97. Potential for net loss-cost ratio | | 97. Potential for net loss-cost ratio | |
| 98. Potential for net cost-gain ratio | | 98. Potential for net cost-gain ratio | |
| 99. Potential for net gain-benefit ratio | | 99. Potential for net gain-benefit ratio | |
| 100. Potential for net benefit-loss ratio | | 100. Potential for net benefit-loss ratio | |

B. short term 550 yrs
 C. long term >50 yrs
 II. Spatial scale
 A. stand
 B. landscape
 III. Forest cover
 A. LPP climax
 B. PP climax
 C. Dry mixed conifer DF, GF,
 PP, WL
 D. Moist mixed conifer DF, WF,
 WL, WWP, LPP
 E. High elevation mixed conifer
 ES, SAF, WBP, MH
 F. Riparian/Wetlands
 PP=Ponderosa pine
 WL=Western larch
 DF=Douglas fir
 GF=Grand fir,
 WF=White fir
 LPP=Lodgepole pine
 WWP=Western white pine
 ES=Engelman spruce
 SAF=Subalpine fir
 WBP=Whitebark pine
 MH=Mountain hemlock

IV. Range type
 A. Juniper woodlands
 B. Grasslands
 1. mountain
 2. palouse
 C. Shrublands
 1. salt desert shrub
 2. xeric sagebrush
 3. mesic sagebrush
 D. Riparian/Wetlands
 V. Structural stage
 A. Early
 B. Stem exclusion
 C. Reinitiation
 VI. Season
 VII. Intensity
 A. severity
 B. number of entries
 VIII. Source of knowledge
 A. Experimental data from
 CRB
 B. Extrapolated from outside
 CRB
 C. No experimental data

IV. Range type
 A. Temperate woodlands
 B. Grasslands
 1. m. coastal
 2. inland
 C. Shrublands
 1. tall shrub
 2. xeric vegetation
 3. mesic vegetation
 D. Riparian/Wetlands
 V. Structural stage
 A. Early
 B. Mid
 C. Late
 VI. Season
 VII. Intensity
 A. Low
 B. Medium
 C. High
 VIII. Source of knowledge
 A. Experimental data from
 CWS
 B. Extrapolated from outside
 CWS
 C. No experimental data

A. Short term 525 yrs
 C. Long term 525 yrs
 12. Special notes
 A. stand
 B. landscape
 C. forest cover
 III. Forest cover
 A. 10% cover
 B. 20% cover
 C. 30% cover
 D. 40% cover
 E. 50% cover
 F. 60% cover
 G. 70% cover
 H. 80% cover
 I. 90% cover
 J. 100% cover
 K. 110% cover
 L. 120% cover
 M. 130% cover
 N. 140% cover
 O. 150% cover
 P. 160% cover
 Q. 170% cover
 R. 180% cover
 S. 190% cover
 T. 200% cover
 U. 210% cover
 V. 220% cover
 W. 230% cover
 X. 240% cover
 Y. 250% cover
 Z. 260% cover
 AA. 270% cover
 AB. 280% cover
 AC. 290% cover
 AD. 300% cover
 AE. 310% cover
 AF. 320% cover
 AG. 330% cover
 AH. 340% cover
 AI. 350% cover
 AJ. 360% cover
 AK. 370% cover
 AL. 380% cover
 AM. 390% cover
 AN. 400% cover
 AO. 410% cover
 AP. 420% cover
 AQ. 430% cover
 AR. 440% cover
 AS. 450% cover
 AT. 460% cover
 AU. 470% cover
 AV. 480% cover
 AW. 490% cover
 AX. 500% cover
 AY. 510% cover
 AZ. 520% cover
 BA. 530% cover
 BB. 540% cover
 BC. 550% cover
 BD. 560% cover
 BE. 570% cover
 BF. 580% cover
 BG. 590% cover
 BH. 600% cover
 BI. 610% cover
 BJ. 620% cover
 BK. 630% cover
 BL. 640% cover
 BM. 650% cover
 BN. 660% cover
 BO. 670% cover
 BP. 680% cover
 BQ. 690% cover
 BR. 700% cover
 BS. 710% cover
 BT. 720% cover
 BU. 730% cover
 BV. 740% cover
 BW. 750% cover
 BX. 760% cover
 BY. 770% cover
 BZ. 780% cover
 CA. 790% cover
 CB. 800% cover
 CC. 810% cover
 CD. 820% cover
 CE. 830% cover
 CF. 840% cover
 CG. 850% cover
 CH. 860% cover
 CI. 870% cover
 CJ. 880% cover
 CK. 890% cover
 CL. 900% cover
 CM. 910% cover
 CN. 920% cover
 CO. 930% cover
 CP. 940% cover
 CQ. 950% cover
 CR. 960% cover
 CS. 970% cover
 CT. 980% cover
 CU. 990% cover
 CV. 1000% cover
 CW. 1010% cover
 CX. 1020% cover
 CY. 1030% cover
 CZ. 1040% cover
 DA. 1050% cover
 DB. 1060% cover
 DC. 1070% cover
 DD. 1080% cover
 DE. 1090% cover
 DF. 1100% cover
 DG. 1110% cover
 DH. 1120% cover
 DI. 1130% cover
 DJ. 1140% cover
 DK. 1150% cover
 DL. 1160% cover
 DM. 1170% cover
 DN. 1180% cover
 DO. 1190% cover
 DP. 1200% cover
 DQ. 1210% cover
 DR. 1220% cover
 DS. 1230% cover
 DT. 1240% cover
 DU. 1250% cover
 DV. 1260% cover
 DW. 1270% cover
 DX. 1280% cover
 DY. 1290% cover
 DZ. 1300% cover
 EA. 1310% cover
 EB. 1320% cover
 EC. 1330% cover
 ED. 1340% cover
 EE. 1350% cover
 EF. 1360% cover
 EG. 1370% cover
 EH. 1380% cover
 EI. 1390% cover
 EJ. 1400% cover
 EK. 1410% cover
 EL. 1420% cover
 EM. 1430% cover
 EN. 1440% cover
 EO. 1450% cover
 EP. 1460% cover
 EQ. 1470% cover
 ER. 1480% cover
 ES. 1490% cover
 ET. 1500% cover
 EU. 1510% cover
 EV. 1520% cover
 EW. 1530% cover
 EX. 1540% cover
 EY. 1550% cover
 EZ. 1560% cover
 FA. 1570% cover
 FB. 1580% cover
 FC. 1590% cover
 FD. 1600% cover
 FE. 1610% cover
 FF. 1620% cover
 FG. 1630% cover
 FH. 1640% cover
 FI. 1650% cover
 FJ. 1660% cover
 FK. 1670% cover
 FL. 1680% cover
 FM. 1690% cover
 FN. 1700% cover
 FO. 1710% cover
 FP. 1720% cover
 FQ. 1730% cover
 FR. 1740% cover
 FS. 1750% cover
 FT. 1760% cover
 FU. 1770% cover
 FV. 1780% cover
 FW. 1790% cover
 FX. 1800% cover
 FY. 1810% cover
 FZ. 1820% cover
 GA. 1830% cover
 GB. 1840% cover
 GC. 1850% cover
 GD. 1860% cover
 GE. 1870% cover
 GF. 1880% cover
 GG. 1890% cover
 GH. 1900% cover
 GI. 1910% cover
 GJ. 1920% cover
 GK. 1930% cover
 GL. 1940% cover
 GM. 1950% cover
 GN. 1960% cover
 GO. 1970% cover
 GP. 1980% cover
 GQ. 1990% cover
 GR. 2000% cover
 GS. 2010% cover
 GT. 2020% cover
 GU. 2030% cover
 GV. 2040% cover
 GW. 2050% cover
 GX. 2060% cover
 GY. 2070% cover
 GZ. 2080% cover
 HA. 2090% cover
 HB. 2100% cover
 HC. 2110% cover
 HD. 2120% cover
 HE. 2130% cover
 HF. 2140% cover
 HG. 2150% cover
 HH. 2160% cover
 HI. 2170% cover
 HJ. 2180% cover
 HK. 2190% cover
 HL. 2200% cover
 HM. 2210% cover
 HN. 2220% cover
 HO. 2230% cover
 HP. 2240% cover
 HQ. 2250% cover
 HR. 2260% cover
 HS. 2270% cover
 HT. 2280% cover
 HU. 2290% cover
 HV. 2300% cover
 HW. 2310% cover
 HX. 2320% cover
 HY. 2330% cover
 HZ. 2340% cover
 IA. 2350% cover
 IB. 2360% cover
 IC. 2370% cover
 ID. 2380% cover
 IE. 2390% cover
 IF. 2400% cover
 IG. 2410% cover
 IH. 2420% cover
 II. 2430% cover
 IJ. 2440% cover
 IK. 2450% cover
 IL. 2460% cover
 IM. 2470% cover
 IN. 2480% cover
 IO. 2490% cover
 IP. 2500% cover
 IQ. 2510% cover
 IR. 2520% cover
 IS. 2530% cover
 IT. 2540% cover
 IU. 2550% cover
 IV. 2560% cover
 IW. 2570% cover
 IX. 2580% cover
 IY. 2590% cover
 IZ. 2600% cover
 JA. 2610% cover
 JB. 2620% cover
 JC. 2630% cover
 JD. 2640% cover
 JE. 2650% cover
 JF. 2660% cover
 JG. 2670% cover
 JH. 2680% cover
 JI. 2690% cover
 JJ. 2700% cover
 JK. 2710% cover
 JL. 2720% cover
 JM. 2730% cover
 JN. 2740% cover
 JO. 2750% cover
 JP. 2760% cover
 JQ. 2770% cover
 JR. 2780% cover
 JS. 2790% cover
 JT. 2800% cover
 JU. 2810% cover
 JV. 2820% cover
 JW. 2830% cover
 JX. 2840% cover
 JY. 2850% cover
 JZ. 2860% cover
 KA. 2870% cover
 KB. 2880% cover
 KC. 2890% cover
 KD. 2900% cover
 KE. 2910% cover
 KF. 2920% cover
 KG. 2930% cover
 KH. 2940% cover
 KI. 2950% cover
 KJ. 2960% cover
 KK. 2970% cover
 KL. 2980% cover
 KM. 2990% cover
 KN. 3000% cover
 KO. 3010% cover
 KP. 3020% cover
 KQ. 3030% cover
 KR. 3040% cover
 KS. 3050% cover
 KT. 3060% cover
 KU. 3070% cover
 KV. 3080% cover
 KW. 3090% cover
 KX. 3100% cover
 KY. 3110% cover
 KZ. 3120% cover
 LA. 3130% cover
 LB. 3140% cover
 LC. 3150% cover
 LD. 3160% cover
 LE. 3170% cover
 LF. 3180% cover
 LG. 3190% cover
 LH. 3200% cover
 LI. 3210% cover
 LJ. 3220% cover
 LK. 3230% cover
 LL. 3240% cover
 LM. 3250% cover
 LN. 3260% cover
 LO. 3270% cover
 LP. 3280% cover
 LQ. 3290% cover
 LR. 3300% cover
 LS. 3310% cover
 LT. 3320% cover
 LU. 3330% cover
 LV. 3340% cover
 LW. 3350% cover
 LX. 3360% cover
 LY. 3370% cover
 LZ. 3380% cover
 MA. 3390% cover
 MB. 3400% cover
 MC. 3410% cover
 MD. 3420% cover
 ME. 3430% cover
 MF. 3440% cover
 MG. 3450% cover
 MH. 3460% cover
 MI. 3470% cover
 MJ. 3480% cover
 MK. 3490% cover
 ML. 3500% cover
 MN. 3510% cover
 MO. 3520% cover
 MP. 3530% cover
 MQ. 3540% cover
 MR. 3550% cover
 MS. 3560% cover
 MT. 3570% cover
 MU. 3580% cover
 MV. 3590% cover
 MW. 3600% cover
 MX. 3610% cover
 MY. 3620% cover
 MZ. 3630% cover
 NA. 3640% cover
 NB. 3650% cover
 NC. 3660% cover
 ND. 3670% cover
 NE. 3680% cover
 NF. 3690% cover
 NG. 3700% cover
 NH. 3710% cover
 NI. 3720% cover
 NJ. 3730% cover
 NK. 3740% cover
 NL. 3750% cover
 NM. 3760% cover
 NO. 3770% cover
 NP. 3780% cover
 NQ. 3790% cover
 NR. 3800% cover
 NS. 3810% cover
 NT. 3820% cover
 NU. 3830% cover
 NV. 3840% cover
 NW. 3850% cover
 NX. 3860% cover
 NY. 3870% cover
 NZ. 3880% cover
 OA. 3890% cover
 OB. 3900% cover
 OC. 3910% cover
 OD. 3920% cover
 OE. 3930% cover
 OF. 3940% cover
 OG. 3950% cover
 OH. 3960% cover
 OI. 3970% cover
 OJ. 3980% cover
 OK. 3990% cover
 OL. 4000% cover
 OM. 4010% cover
 ON. 4020% cover
 OO. 4030% cover
 OP. 4040% cover
 OQ. 4050% cover
 OR. 4060% cover
 OS. 4070% cover
 OT. 4080% cover
 OU. 4090% cover
 OV. 4100% cover
 OW. 4110% cover
 OX. 4120% cover
 OY. 4130% cover
 OZ. 4140% cover
 PA. 4150% cover
 PB. 4160% cover
 PC. 4170% cover
 PD. 4180% cover
 PE. 4190% cover
 PF. 4200% cover
 PG. 4210% cover
 PH. 4220% cover
 PI. 4230% cover
 PJ. 4240% cover
 PK. 4250% cover
 PL. 4260% cover
 PM. 4270% cover
 PN. 4280% cover
 PO. 4290% cover
 PP. 4300% cover
 PQ. 4310% cover
 PR. 4320% cover
 PS. 4330% cover
 PT. 4340% cover
 PU. 4350% cover
 PV. 4360% cover
 PW. 4370% cover
 PX. 4380% cover
 PY. 4390% cover
 PZ. 4400% cover
 QA. 4410% cover
 QB. 4420% cover
 QC. 4430% cover
 QD. 4440% cover
 QE. 4450% cover
 QF. 4460% cover
 QG. 4470% cover
 QH. 4480% cover
 QI. 4490% cover
 QJ. 4500% cover
 QK. 4510% cover
 QL. 4520% cover
 QM. 4530% cover
 QN. 4540% cover
 QO. 4550% cover
 QP. 4560% cover
 QQ. 4570% cover
 QR. 4580% cover
 QS. 4590% cover
 QT. 4600% cover
 QU. 4610% cover
 QV. 4620% cover
 QW. 4630% cover
 QX. 4640% cover
 QY. 4650% cover
 QZ. 4660% cover
 RA. 4670% cover
 RB. 4680% cover
 RC. 4690% cover
 RD. 4700% cover
 RE. 4710% cover
 RF. 4720% cover
 RG. 4730% cover
 RH. 4740% cover
 RI. 4750% cover
 RJ. 4760% cover
 RK. 4770% cover
 RL. 4780% cover
 RM. 4790% cover
 RN. 4800% cover
 RO. 4810% cover
 RP. 4820% cover
 RQ. 4830% cover
 RR. 4840% cover
 RS. 4850% cover
 RT. 4860% cover
 RU. 4870% cover
 RV. 4880% cover
 RW. 4890% cover
 RX. 4900% cover
 RY. 4910% cover
 RZ. 4920% cover
 SA. 4930% cover
 SB. 4940% cover
 SC. 4950% cover
 SD. 4960% cover
 SE. 4970% cover
 SF. 4980% cover
 SG. 4990% cover
 SH. 5000% cover
 SI. 5010% cover
 SJ. 5020% cover
 SK. 5030% cover
 SL. 5040% cover
 SM. 5050% cover
 SN. 5060% cover
 SO. 5070% cover
 SP. 5080% cover
 SQ. 5090% cover
 SR. 5100% cover
 SS. 5110% cover
 ST. 5120% cover
 SU. 5130% cover
 SV. 5140% cover
 SW. 5150% cover
 SX. 5160% cover
 SY. 5170% cover
 SZ. 5180% cover
 TA. 5190% cover
 TB. 5200% cover
 TC. 5210% cover
 TD. 5220% cover
 TE. 5230% cover
 TF. 5240% cover
 TG. 5250% cover
 TH. 5260% cover
 TI. 5270% cover
 TJ. 5280% cover
 TK. 5290% cover
 TL. 5300% cover
 TM. 5310% cover
 TN. 5320% cover
 TO. 5330% cover
 TP. 5340% cover
 TQ. 5350% cover
 TR. 5360% cover
 TS. 5370% cover
 TT. 5380% cover
 TU. 5390% cover
 TV. 5400% cover
 TW. 5410% cover
 TX. 5420% cover
 TY. 5430% cover
 TZ. 5440% cover
 UA. 5450% cover
 UB. 5460% cover
 UC. 5470% cover
 UD. 5480% cover
 UE. 5490% cover
 UF. 5500% cover
 UG. 5510% cover
 UH. 5520% cover
 UI. 5530% cover
 UJ. 5540% cover
 UK. 5550% cover
 UL. 5560% cover
 UM. 5570% cover
 UN. 5580% cover
 UO. 5590% cover
 UP. 5600% cover
 UQ. 5610% cover
 UR. 5620% cover
 US. 5630% cover
 UT. 5640% cover
 UU. 5650% cover
 UV. 5660% cover
 UW. 5670% cover
 UX. 5680% cover
 UY. 5690% cover
 UZ. 5700% cover
 VA. 5710% cover
 VB. 5720% cover
 VC. 5730% cover
 VD. 5740% cover
 VE. 5750% cover
 VF. 5760% cover
 VG. 5770% cover
 VH. 5780% cover
 VI. 5790% cover
 VJ. 5800% cover
 VK. 5810% cover
 VL. 5820% cover
 VM. 5830% cover
 VN. 5840% cover
 VO. 5850% cover
 VP. 5860% cover
 VQ. 5870% cover
 VR. 5880% cover
 VS. 5890% cover
 VT. 5900% cover
 VU. 5910% cover
 VV. 5920% cover
 VW. 5930% cover
 VX. 5940% cover
 VY. 5950% cover
 VZ. 5960% cover
 WA. 5970% cover
 WB. 5980% cover
 WC. 5990% cover
 WD. 6000% cover
 WE. 6010% cover
 WF. 6020% cover
 WG. 6030% cover
 WH. 6040% cover
 WI. 6050% cover
 WJ. 6060% cover
 WK. 6070% cover
 WL. 6080% cover
 WM. 6090% cover
 WN. 6100% cover
 WO. 6110% cover
 WP. 6120% cover
 WQ. 6130% cover
 WR. 6140% cover
 WS. 6150% cover
 WT. 6160% cover
 WU. 6170% cover
 WV. 6180% cover
 WX. 6190% cover
 WY. 6200% cover
 WZ. 6210% cover
 XA. 6220% cover
 XB. 6230% cover
 XC. 6240% cover
 XD. 6250% cover
 XE. 6260% cover
 XF. 6270% cover
 XG. 6280% cover
 XH. 6290% cover
 XI. 6300% cover
 XJ. 6310% cover
 XK. 6320% cover
 XL. 6330% cover
 XM. 6340% cover
 XN. 6350% cover
 XO. 6360% cover
 XP. 6370% cover
 XQ. 6380% cover
 XR. 6390% cover
 XS. 6400% cover
 XT. 6410% cover
 XU. 6420% cover
 XV. 6430% cover
 XW. 6440% cover
 XX. 6450% cover
 XY. 6460% cover
 XZ. 6470% cover
 YA. 6480% cover
 YB. 6490% cover
 YC. 6500% cover
 YD. 6510% cover
 YE. 6520% cover
 YF. 6530% cover
 YG. 6540% cover
 YH. 6550% cover
 YI. 6560% cover
 YJ. 6570% cover
 YK. 6580% cover
 YL. 6590% cover
 YM. 6600% cover
 YN. 6610% cover
 YO. 6620% cover
 YP. 6630% cover
 YQ. 6640% cover
 YR. 6650% cover
 YS. 6660% cover
 YT. 6670% cover
 YU. 6680% cover
 YV. 6690% cover
 YW. 6700% cover
 YX. 6710% cover
 YY. 6720% cover
 YZ. 6730% cover
 ZA. 6740% cover
 ZB. 6750% cover
 ZC. 6760% cover
 ZD. 6770% cover
 ZE. 6780% cover
 ZF. 6790% cover
 ZG. 6800% cover
 ZH. 6810% cover
 ZI. 6820% cover
 ZJ. 6830% cover
 ZK. 6840% cover
 ZL. 6850% cover
 ZM. 6860% cover
 ZN. 6870% cover
 ZO. 6880% cover
 ZP. 6890% cover
 ZQ. 6900% cover
 ZR. 6910% cover
 ZS. 6920% cover
 ZT. 6930% cover
 ZU. 6940% cover
 ZV. 6950% cover
 ZW. 6960% cover
 ZX. 6970% cover
 ZY. 6980% cover
 ZZ. 6990% cover

Appendix xx. Historical and current habitat area for select invertebrate species in the Interior Columbia River Basin based on vegetation types mapped from satellite imagery at a 1-km² pixel resolution.

| Family | Species code | Scientific name | Common Name | Historic habitat (ha) | Current habitat (ha) | Change from historic (%) |
|-----------------|--------------|----------------------------------|-------------------------|-----------------------|----------------------|--------------------------|
| Adelgidae | ADEPIC | <i>Adelges piceae</i> | | 2,706,400 | 6,091,900 | 125.1 |
| Alydidae | ALYCAL | <i>Alydus calcaratus</i> | | na | 10,923,100 | na |
| Anthocoridae | ORITRI | <i>Orius tristicolor</i> | | 43,245,400 | 37,754,600 | -12.7 |
| Anthocoridae | TETLAT | <i>Tetraphleps latipennis</i> | | 12,942,200 | 10,405,700 | -19.6 |
| Berytidae | JALWIC | <i>Jalysus wickhami</i> | | 23,952,900 | 35,252,200 | 47.2 |
| Carabidae | NEBGFR | <i>Nebria gebleri fragariae</i> | | 545,600 | 544,500 | -0.2 |
| Carabidae | NEBVWY | <i>Nebria vandykei wyeast</i> | Wyeast's gazelle beetle | 773,500 | 772,200 | -0.2 |
| Carabidae | PTEPRO | <i>Pterostichus protractus</i> | | 28,046,500 | 24,853,400 | -11.4 |
| Chriporellidae | CHRSCR | <i>Chrysomela scripta</i> | Cottonwood leaf beetle | 409,300 | 160,000 | -60.9 |
| Cicindellidae | CICWEC | <i>Cicindela willistoni echo</i> | | 1,977,800 | 1,539,500 | -22.2 |
| Cicindellide | CICARE | <i>Cicindela arenicola</i> | | 138,300 | 138,300 | 0.0 |
| Cicindellide | CICCOL | <i>Cicindela columbica</i> | | 683,900 | 682,800 | -0.2 |
| Cimicidae | CIMLET | <i>Cimex latipennis</i> | | 43,245,400 | 37,754,600 | -12.7 |
| Cleridae | ENOSPH | <i>Enoclerus sphegeus</i> | | 20,869,300 | 21,754,800 | 4.2 |
| Coccinellidae | HYPLAT | <i>Hyperaspis lateralis</i> | | 21,994,800 | 27,179,300 | 23.6 |
| Coleophoridae | COLLAR | <i>Coleophora laricella</i> | Larch casebearer | 2,132,700 | 1,369,800 | -35.8 |
| Coreidae | CHEVIT | <i>Chelinidea vittiger</i> | | 16,701,600 | 11,571,700 | -30.7 |
| Coreidae | LEPOCC | <i>Leptoglossus occidentalis</i> | | 9,015,200 | 5,938,800 | -34.1 |
| Corixidae | CALAUD | <i>Callicorixa audeni</i> | | 545,600 | 544,500 | -0.2 |
| Corixidae | CORDEC | <i>Corisella decolor</i> | | 545,600 | 544,500 | -0.2 |
| Cydnidae | MICOB | <i>Microporus obliquus</i> | | 1,856,200 | 2,230,100 | 20.1 |
| Dipriohidae | NEOFUL | <i>Neodiprion fulviceps</i> | Pine sawfly spp. | 7,967,500 | 5,892,600 | -26.0 |
| Enicocephalidae | BORAME | <i>Boreostolus americanus</i> | | 545,600 | 544,500 | -0.2 |
| Formicidae | CAMMOD | <i>Camponotus modoc</i> | Carpenter ant | 6,156,700 | 9,022,500 | 46.5 |
| Formicidae | FOROBS | <i>Formica obscuripes</i> | Thatch ant | 43,367,900 | 48,731,600 | 12.4 |

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|----------------------|--------|------------------------------------|--------------------------|------------|------------|-------|
| Gelastocoridae | GELOCU | <i>Gelastocoris oculatus</i> | | 545,600 | 544,500 | -0.2 |
| Gelechiidae | COLMIL | <i>Coleotechnites milleri</i> | Lodgepole needle miner | 4,430,200 | 4,227,900 | -4.6 |
| Geometridae | ALSPOM | <i>Alsophila pometaria</i> | Fall cankerworm | 563,100 | 1,046,200 | 85.8 |
| Geometridae | DREUNI | <i>Drepanulatrix unicalcararia</i> | | 172,700 | 100,200 | -42.0 |
| Gerridae | GERGIL | <i>Gerris gillettei</i> | | 545,600 | 544,500 | -0.2 |
| Gnaphosidae/Araneida | ZELHEN | <i>Zelotes hentzi</i> | | 21,994,800 | 27,179,300 | 23.6 |
| Herbidae | HEBBUE | <i>Hebrus buenoi</i> | | 22,540,400 | 27,723,800 | 23.0 |
| Hesperiidae | POLMAR | <i>Polites mardon</i> | Mardon skipper | 172,700 | 100,200 | -42.0 |
| Lasiocampidae | MALDIS | <i>Malacosoma disstria</i> | Forest tent caterpillar | 563,100 | 1,046,200 | 85.8 |
| Leioididae | GLABAT | <i>Glacicavicola bathyscoides</i> | | 138,300 | 138,300 | 0.0 |
| Lumbricidae | ALLTUR | <i>Allolobophora turgida</i> | | 21,994,800 | 16,256,200 | -26.1 |
| Lycaenidae | MITJOH | <i>Mitowra johnsoni</i> | | 7,967,500 | 5,892,600 | -26.0 |
| Lycosidae/Araneida | ARCLIT | <i>Arctosa littoralis</i> | | 545,600 | 544,500 | -0.2 |
| Lygaeidae | EURRUB | <i>Europiella rubricornis</i> | | 1,293,900 | 856,700 | -33.8 |
| Lygaeidae | GASPAC | <i>Gastrodes pacificus</i> | | 3,754,300 | 4,782,800 | 27.4 |
| Lygaeidae | GEOBUL | <i>Geocoris bullatus</i> | | 31,234,300 | 30,116,900 | -3.6 |
| Lygaeidae | MALANG | <i>Malezonotus angustatus</i> | | 12,942,200 | 10,405,700 | -19.6 |
| Lymantriidae | ORGPSE | <i>Orgyia pseudotsugata</i> | Douglas-fir tussock moth | 8,473,300 | 11,726,600 | 38.4 |
| Meloidae | EPINOR | <i>Epicanta normalis</i> | | 29,395,900 | 28,975,000 | -1.4 |
| Miridae | ADESUP | <i>Adelphocoris superbus</i> | | 54,214,800 | 42,316,700 | -21.9 |
| Miridae | ATRBAL | <i>Atractotomus balli</i> | | 21,245,400 | 15,684,700 | -26.2 |
| Miridae | DERBRE | <i>Dereocoris brevis</i> | | 51,290,800 | 53,399,900 | 4.1 |
| Miridae | DICSPP | <i>Dichaetocoris spp.</i> | | na | 10,923,100 | na |
| Miridae | IRBPAC | <i>Irbisia pacifica</i> | | 31,234,300 | 19,193,800 | -38.5 |
| Miridae | LABHES | <i>Labops hesperius</i> | | 29,395,900 | 18,051,900 | -38.6 |
| Miridae | LOPNIG | <i>Lopidea nigridea</i> | | 52,920,900 | 41,460,000 | -21.7 |
| Miridae | LYGELI | <i>Lygus elisus</i> | | 22,319,700 | 16,217,600 | -27.3 |
| Miridae | MYRORE | <i>Myrmecophyes oregonensis</i> | | 29,395,900 | 18,051,900 | -38.6 |

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|------------------------------|--------|---------------------------------|--------------------------|------------|------------|-------|
| Miridae | NEOXAN | <i>Neoborella xanthenes</i> | | 12,397,700 | 10,120,500 | -18.4 |
| Miridae | PHYJUN | <i>Phytocoris juniperanus</i> | | 2,400,700 | 13,438,400 | 459.8 |
| Miridae | PHYLAE | <i>Phytocoris laevis</i> | | 22,319,700 | 16,217,600 | -27.3 |
| Miridae | PHYLAT | <i>Phytocoris lattini</i> | | 545,600 | 544,500 | -0.2 |
| Miridae | PHYNIG | <i>Phytocoris nigrolineatus</i> | | 20,481,300 | 25,998,800 | 26.9 |
| Miridae | PHYTE | <i>Phytocoris stellatus</i> | | 4,430,200 | 4,227,900 | -4.6 |
| Miridae | PHYVOL | <i>Phytocoris yollabollae</i> | | 3,754,300 | 4,782,800 | 27.4 |
| Miridae | PILTIB | <i>Pilophorus tibialis</i> | | 12,397,700 | 10,120,500 | -18.4 |
| Miridae | PLARUB | <i>Platylygus rubripes</i> | | 12,397,700 | 10,120,500 | -18.4 |
| Nabidae | NABVAN | <i>Nabica vanduzeei</i> | | 10,021,400 | 4,634,800 | -53.8 |
| Nabidae | NABALT | <i>Nabis alternatus</i> | | 23,952,900 | 24,329,100 | 1.6 |
| Naucoridae | AMBMOR | <i>Ambrysus mormon</i> | | 22,540,400 | 16,800,700 | -25.5 |
| Noctuidae | SYNORO | <i>Syngrapha orophila</i> | | 172,700 | 100,200 | -42.0 |
| Notonectidae | NOTKIR | <i>Notonecta kirbyi</i> | | 545,600 | 544,500 | -0.2 |
| Nymphalidae | NYMANT | <i>Nymphalis antiopa</i> | Mourningcloak butterfly | 409,300 | 160,000 | -60.9 |
| Olethrentidae | EUCSON | <i>Eucosma sonomana</i> | Western pine shoot borer | 12,397,700 | 10,120,500 | -18.4 |
| Papilionidae | PAPZEL | <i>Papilio zelicaon</i> | | na | 10,923,100 | na |
| Papilionidae | PARCLO | <i>Parnassius clodius</i> | | 138,300 | 138,300 | 0.0 |
| Pentatomidae | CHLOPU | <i>Chlorochroa opuntiae</i> | | 16,701,600 | 11,571,700 | -30.7 |
| Pentatomidae | CODREM | <i>Codophila remota</i> | | 21,994,800 | 27,179,300 | 23.6 |
| Pentatomidae | ZICCAE | <i>Zicrona caerulea</i> | | 21,994,800 | 27,179,300 | 23.6 |
| Phymatidae | PHYAME | <i>Phymata americana</i> | | 20,700,900 | 26,322,600 | 27.2 |
| Pieridae | COLPEL | <i>Colias pelidne</i> | | 89,600 | 89,400 | -0.2 |
| Pieridae | NEOMEN | <i>Neophasia menapia</i> | Pine butterfly | 12,397,700 | 10,120,500 | -18.4 |
| Pseudogarypidae/Chernillidae | PSEHES | <i>Pseudogarypus hesperus</i> | | 9,521,000 | 11,772,800 | 23.7 |
| Reduviidae | SINDIA | <i>Sinea diadema</i> | | 20,700,900 | 26,322,600 | 27.2 |
| Rhopalidae | BOIRUB | <i>Boisea rubrolineata</i> | | 545,600 | 544,500 | -0.2 |
| Rhopalidae | CHOSNO | <i>Chorosoma sp nov</i> | | 1,293,900 | 856,700 | -33.8 |
| Saldidae | IOSPOL | <i>Ioscytus politus</i> | | 545,600 | 544,500 | -0.2 |

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|------------------------|--------|-----------------------------------|------------------------|------------|------------|-------|
| Saldidae | MICFEN | <i>Micracanthia fennica</i> | | 22,540,400 | 27,723,800 | 23.0 |
| Saldidae | SALBUE | <i>Salda buenoi</i> | | 545,600 | 544,500 | -0.2 |
| Salticidae | METAEN | <i>Metaphidipous aeneolus</i> | Jumping spider | 18,554,400 | 19,143,000 | 3.2 |
| Saturniidae | COLPAN | <i>Coloradia pandora</i> | Pandora moth | 12,397,700 | 10,120,500 | -18.4 |
| Saturniidae | HEMHER | <i>Hemileuca hera</i> | | na | 10,923,100 | na |
| Scolytidae | DENBRE | <i>Dendroctonus brevicomis</i> | | 9,015,200 | 5,938,800 | -34.1 |
| Scolytidae | DENPON | <i>Dendroctonus ponderosae</i> | | 17,894,700 | 14,240,600 | -20.4 |
| Scolytidae | DENPSE | <i>Dendroctonus pseudotsugae</i> | | 14,308,100 | 16,249,400 | 13.6 |
| Scolytidae | DENRUF | <i>Dendroctonus rufipennis</i> | | 6,746,800 | 6,932,000 | 2.7 |
| Scolytidae | SCOVEN | <i>Scolytus ventralis</i> | | 269,700 | 2,869,900 | 964.1 |
| Scutelleridae | HOMBIJ | <i>Homaemus bijugis</i> | | 8,914,600 | 2,976,200 | -66.6 |
| Scutelleridae | TETROB | <i>Tetyra robusta</i> | | 1,106,800 | 1,658,600 | 49.9 |
| Shore bug family? | SALEXP | <i>Saldula explanata</i> | | 3,754,300 | 4,782,800 | 27.4 |
| Shore bug family? | SALNIG | <i>Saldula nigrita</i> | | 545,600 | 544,500 | -0.2 |
| Sphingidae | SPHVAS | <i>Sphinx vashti</i> | | 172,700 | 100,200 | -42.0 |
| Tenchodiniidae | PRIERI | <i>Pristophora erichsonii</i> | Larch sawfly | 2,132,700 | 1,369,800 | -35.8 |
| Tenthredinidae | PONPAC | <i>Pontania pacifica</i> | Gall-forming sawflies | 409,300 | 160,000 | -60.9 |
| Theridilidae/Araneida | LATHES | <i>Latrodectus hesperus</i> | | 22,539,300 | 27,464,500 | 21.9 |
| Thyreocoridae | COREXT | <i>Corimelaena extensa</i> | | 31,234,300 | 19,193,800 | -38.5 |
| Tingidae | CORIMM | <i>Corythucha immaculata</i> | | 26,022,500 | 17,289,300 | -33.6 |
| Tingidae | CORMOL | <i>Corythucha mollicula</i> | | 545,600 | 544,500 | -0.2 |
| Tortricidae | CHOCON | <i>Choristoneura conflictana</i> | Large aspen tortrix | 563,100 | 1,046,200 | 85.8 |
| Tortricidae | CHOCC | <i>Choristoneura occidentalis</i> | Western spruce budworm | 6,340,600 | 10,356,800 | 63.3 |
| Travuniidae/Phalangida | SPESEN | <i>Speleonychia sengeri</i> | | 138,300 | 138,300 | 0.0 |
| Veliidae | MICBUE | <i>Microvelia buenoi</i> | | 545,600 | 544,500 | -0.2 |
| Veludae | RHADIS | <i>Rhagovelia distincta</i> | | 545,600 | 544,500 | -0.2 |
| Vespidae | VESPEN | <i>Vespula pensylvanica</i> | Western yellow jacket | 55,818,500 | 54,315,500 | -2.7 |
| | NEORID | <i>Neomis ridingsii</i> | | na | 10,923,100 | na |

Appendix INVEHERB. Invertebrate species using open and closed grassland/herb structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project. Species were determined from a select list of 206 invertebrate species representative of habitats and functions in the ICBEMP assessment area.

| Family | Scientific name | Common name | Versatility |
|--------------------------|------------------------------------|----------------|-------------|
| Alydidae | <i>Alydus calcaratus</i> | | 0 |
| Geometridae | <i>Drepanulatrix unicalcararia</i> | | 0 |
| Hesperiidae | <i>Polites mardon</i> | Mardon skipper | 0 |
| Miridae | <i>Dichaetocoris</i> spp. | | 0 |
| Noctuidae | <i>Syngrapha orophila</i> | | 0 |
| Papilionidae | <i>Papilio zelicaon</i> | | 0 |
| Saturniidae | <i>Hemileuca hera</i> | | 0 |
| Sphingidae | <i>Sphinx vashti</i> | | 0 |
| | <i>Neomis ridingsii</i> | | 0 |
| Cicindellidae | <i>Cicindela willistoni</i> | echo | 1 |
| Lygaeidae | <i>Europiella rubricornis</i> | | 1 |
| Rhopalidae | <i>Chorosoma</i> sp nov | | 1 |
| Coreidae | <i>Chelinidea vittiger</i> | | 2 |
| Pentatomidae | <i>Chlorochroa opuntiae</i> | | 2 |
| Scutelleridae | <i>Homaemus bijugis</i> | | 2 |
| Carabidae | <i>Pterostichus protractus</i> | | 7 |
| Berytidae | <i>Jalysus wickhami</i> | | 8 |
| Cydnidae | <i>Microporus obliquus</i> | | 8 |
| Formicidae | <i>Formica obscuripes</i> | Thatch ant | 8 |
| Miridae | <i>Phytocoris juniperanus</i> | | 8 |
| Coccinellidae | <i>Hyperaspis lateralis</i> | | 9 |
| Gnaphosidae/ Araneida | <i>Zelotes hentzi</i> | | 9 |
| Herpidae | <i>Hebrus buenoi</i> | | 9 |
| Lumbricidae | <i>Allolobophora turgida</i> | | 9 |
| Lygaeidae | <i>Geocoris bullatus</i> | | 9 |
| Meloidae | <i>Epicanta normalis</i> | | 9 |
| Miridae | <i>Atractotomus balli</i> | | 9 |
| Miridae | <i>Dereocoris brevis</i> | | 9 |
| Miridae | <i>Irbisia pacifica</i> | | 9 |
| Miridae | <i>Labops hesperius</i> | | 9 |
| Miridae | <i>Lopidea nigridea</i> | | 9 |
| Miridae | <i>Lygus elisus</i> | | 9 |
| Miridae | <i>Myrmecophyes oregonensis</i> | | 9 |
| Miridae | <i>Phytocoris laevis</i> | | 9 |
| Miridae | <i>Phytocoris nigrolineatus</i> | | 9 |

Appendix INVESH RB. Invertebrate species using open or closed, low-medium shrub structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project. Species were determined from a select list of 206 invertebrate species representative of habitats and functions in the ICBEMP assessment area.

| Family | Scientific name | Common name | Versatility |
|----------------------|------------------------------------|----------------|-------------|
| Alydidae | <i>Alydus calcaratus</i> | | 0 |
| Geometridae | <i>Drepanulatrix unicalcararia</i> | | 0 |
| Hesperiidae | <i>Polites mardon</i> | Mardon skipper | 0 |
| Miridae | <i>Dichaetocoris</i> spp. | | 0 |
| Noctuidae | <i>Syngrapha orophila</i> | | 0 |
| Papilionidae | <i>Papilio zelicaon</i> | | 0 |
| Saturniidae | <i>Hemileuca hera</i> | | 0 |
| Sphingidae | <i>Sphinx vashti</i> | | 0 |
| | <i>Neomis ridingsii</i> | | 0 |
| Cicindellidae | <i>Cicindela willistoni</i> | | 1 |
| | echo | | |
| Lygaeidae | <i>Europiella rubricornis</i> | | 1 |
| Rhopalidae | <i>Chorosoma</i> sp nov | | 1 |
| Coreidae | <i>Chelinidea vittiger</i> | | 2 |
| Pentatomidae | <i>Chlorochroa opuntiae</i> | | 2 |
| Scutelleridae | <i>Homaemus bijugis</i> | | 2 |
| Carabidae | <i>Pterostichus protractus</i> | | 7 |
| Berytidae | <i>Jalysus wickhami</i> | | 8 |
| Cydnidae | <i>Microporus obliquus</i> | | 8 |
| Formicidae | <i>Formica obscuripes</i> | Thatch ant | 8 |
| Miridae | <i>Phytocoris juniperanus</i> | | 8 |
| Coccinellidae | <i>Hyperaspis lateralis</i> | | 9 |
| Gnaphosidae/araneida | <i>Zelotes hentzi</i> | | 9 |
| Herbridae | <i>Hebrus buenoi</i> | | 9 |
| Lumbricidae | <i>Allolobophora turgida</i> | | 9 |
| Lygaeidae | <i>Geocoris bullatus</i> | | 9 |
| Meloidae | <i>Epicanta normalis</i> | | 9 |
| Miridae | <i>Atractotomus balli</i> | | 9 |
| Miridae | <i>Dereocoris brevis</i> | | 9 |
| Miridae | <i>Irbisia pacifica</i> | | 9 |
| Miridae | <i>Labops hesperius</i> | | 9 |
| Miridae | <i>Lopidea nigridea</i> | | 9 |
| Miridae | <i>Lygus elisus</i> | | 9 |
| Miridae | <i>Myrmecophyes oregonensis</i> | | 9 |
| Miridae | <i>Phytocoris laevis</i> | | 9 |

| | | | |
|-----------------------|-----------------------------|-----------------------|----|
| Miridae | <i>Phytocoris</i> | | 9 |
| | <i>nigrolineatus</i> | | |
| Nabidae | <i>Nabicula vanduzeei</i> | | 9 |
| Naucoridae | <i>Ambrysus mormon</i> | | 9 |
| Pentatomidae | <i>Codophila remota</i> | | 9 |
| Pentatomidae | <i>Zicrona caerulea</i> | | 9 |
| Phymatidae | <i>Phymata americana</i> | | 9 |
| Reduviidae | <i>Sinea diadema</i> | | 9 |
| Saldidae | <i>Micracanthia fennica</i> | | 9 |
| Theridilidae/araneida | <i>Latrodectus hesperus</i> | | 9 |
| Thyreocoridae | <i>Corimelaena extensa</i> | | 9 |
| Tingidae | <i>Corythucha</i> | | 9 |
| | <i>immaculata</i> | | |
| Vespidae | <i>Vespula pensylvanica</i> | Western yellow jacket | 9 |
| Anthocoridae | <i>Orius tristicolor</i> | | 11 |
| Cimicidae | <i>Cimex latipennis</i> | | 11 |
| Miridae | <i>Adelphocoris</i> | | 11 |
| | <i>superbus</i> | | |

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|-----|------------|--------------|
| 1 | Myiophobus | Myiophobidae |
| 2 | Myiophobus | Myiophobidae |
| 3 | Myiophobus | Myiophobidae |
| 4 | Myiophobus | Myiophobidae |
| 5 | Myiophobus | Myiophobidae |
| 6 | Myiophobus | Myiophobidae |
| 7 | Myiophobus | Myiophobidae |
| 8 | Myiophobus | Myiophobidae |
| 9 | Myiophobus | Myiophobidae |
| 10 | Myiophobus | Myiophobidae |
| 11 | Myiophobus | Myiophobidae |
| 12 | Myiophobus | Myiophobidae |
| 13 | Myiophobus | Myiophobidae |
| 14 | Myiophobus | Myiophobidae |
| 15 | Myiophobus | Myiophobidae |
| 16 | Myiophobus | Myiophobidae |
| 17 | Myiophobus | Myiophobidae |
| 18 | Myiophobus | Myiophobidae |
| 19 | Myiophobus | Myiophobidae |
| 20 | Myiophobus | Myiophobidae |
| 21 | Myiophobus | Myiophobidae |
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| 24 | Myiophobus | Myiophobidae |
| 25 | Myiophobus | Myiophobidae |
| 26 | Myiophobus | Myiophobidae |
| 27 | Myiophobus | Myiophobidae |
| 28 | Myiophobus | Myiophobidae |
| 29 | Myiophobus | Myiophobidae |
| 30 | Myiophobus | Myiophobidae |
| 31 | Myiophobus | Myiophobidae |
| 32 | Myiophobus | Myiophobidae |
| 33 | Myiophobus | Myiophobidae |
| 34 | Myiophobus | Myiophobidae |
| 35 | Myiophobus | Myiophobidae |
| 36 | Myiophobus | Myiophobidae |
| 37 | Myiophobus | Myiophobidae |
| 38 | Myiophobus | Myiophobidae |
| 39 | Myiophobus | Myiophobidae |
| 40 | Myiophobus | Myiophobidae |
| 41 | Myiophobus | Myiophobidae |
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| 91 | Myiophobus | Myiophobidae |
| 92 | Myiophobus | Myiophobidae |
| 93 | Myiophobus | Myiophobidae |
| 94 | Myiophobus | Myiophobidae |
| 95 | Myiophobus | Myiophobidae |
| 96 | Myiophobus | Myiophobidae |
| 97 | Myiophobus | Myiophobidae |
| 98 | Myiophobus | Myiophobidae |
| 99 | Myiophobus | Myiophobidae |
| 100 | Myiophobus | Myiophobidae |

* - Vertically varying numbers the number of other structural stages used by the species (if any).

Appendix INVEOLDF. Invertebrate species using single- and multi-storied old forest structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project. Species were determined from a select list of 206 invertebrate species representative of habitats and functions in the ICBEMP assessment area.

| Family | Scientific name | Common name | Versatility |
|---------------------------------|-----------------------------------|--------------------------|-------------|
| Diprionidae | <i>Neodiprion fulviceps</i> | Pine sawfly spp. | 0 |
| Formicidae | <i>Camponotus modoc</i> | Carpenter ant | 0 |
| Lycaenidae | <i>Mitowra johnsoni</i> | | 0 |
| Pseudogarypidae/ Chernilldal | <i>Pseudogarypus hesperus</i> | | 0 |
| Scolytidae | <i>Dendroctonus pseudotsugae</i> | | 0 |
| Gelechiidae | | Lodgepole needle miner | 1 |
| Saturniidae | <i>Coloradia pandora</i> | Pandora moth | 1 |
| Coleophoridae | <i>Coleophora laricella</i> | Larch casebearer | 2 |
| Coreidae | <i>Leptoglossus occidentalis</i> | | 2 |
| Lygaeidae | <i>Gastrodes pacificus</i> | | 2 |
| Lygaeidae | <i>Malezonotus angustatus</i> | | 2 |
| Lymantriidae | <i>Orgyia pseudotsugata</i> | Douglas-fir tussock moth | 2 |
| Pieridae | <i>Neophasia menapia</i> | Pine butterfly | 2 |
| Tortricidae | <i>Choristoneura conflictana</i> | Large aspen tortrix | 2 |
| Tortricidae | <i>Choristoneura occidentalis</i> | Western spruce budworm | 2 |
| Adelgidae | <i>Adelges piceae</i> | | 3 |
| Cleridae | <i>Enoclerus spegeus</i> | | 3 |
| Geometridae | <i>Alsophila pometaria</i> | Fall cankerworm | 3 |
| Lasiocampidae | <i>Malacosoma disstria</i> | Forest tent caterpillar | 3 |
| Miridae | <i>Neoborella xanthenes</i> | | 3 |
| Miridae | <i>Phytocoris yollabollae</i> | | 3 |
| Miridae | <i>Platylygus rubripes</i> | | 3 |
| Scolytidae | <i>Dendroctonus brevicomis</i> | | 3 |
| Scolytidae | <i>Dendroctonus ponderosae</i> | | 3 |
| Scolytidae | <i>Dendroctonus rufipennis</i> | | 3 |
| Scolytidae | <i>Scolytus ventralis</i> | | 3 |
| Tenchodidae | <i>Pristophora erichsonii</i> | Larch sawfly | 3 |
| Miridae | <i>Pilophorus tibialis</i> | | 4 |
| Salticidae | <i>Metaphidipous aeneolus</i> | Jumping spider | 4 |
| Shore bug family? | | | 4 |
| Anthracoridae | <i>Tetrableps latipennis</i> | | 5 |
| Scutelleridae | <i>Tetyra robusta</i> | | 5 |
| Carabidae | <i>Pterostichus protractus</i> | | 7 |

| | | | |
|---------------------------|---------------------------------|-----------------------|----|
| Berytidae | <i>Jalysus wickhami</i> | | 8 |
| Cydnidae | <i>Microporus obliquus</i> | | 8 |
| Formicidae | <i>Formica obscuripes</i> | Thatch ant | 8 |
| Miridae | <i>Phytocoris juniperanus</i> | | 8 |
| Coccinellidae | <i>Hyperaspis lateralis</i> | | 9 |
| Gnaphosidae/ Araneida | <i>Zelotes hentzi</i> | | 9 |
| Herbidae | <i>Hebrus buenoi</i> | | 9 |
| Lumbricidae | <i>Allolobophora turgida</i> | | 9 |
| Lygaeidae | <i>Geocoris bullatus</i> | | 9 |
| Meloidae | <i>Epicanta normalis</i> | | 9 |
| Miridae | <i>Atractotomus balli</i> | | 9 |
| Miridae | <i>Dereocoris brevis</i> | | 9 |
| Miridae | <i>Irbisia pacifica</i> | | 9 |
| Miridae | <i>Labops hesperius</i> | | 9 |
| Miridae | <i>Lopidea nigridea</i> | | 9 |
| Miridae | <i>Lygus elisus</i> | | 9 |
| Miridae | <i>Myrmecophyes oregonensis</i> | | 9 |
| Miridae | <i>Phytocoris laevis</i> | | 9 |
| Miridae | <i>Phytocoris nigrolineatus</i> | | 9 |
| Nabidae | <i>Nabicula vanduzeei</i> | | 9 |
| Naucoridae | <i>Ambrysus mormon</i> | | 9 |
| Pentatomidae | <i>Codophila remota</i> | | 9 |
| Pentatomidae | <i>Zicrona caerulea</i> | | 9 |
| Phymatidae | <i>Phymata americana</i> | | 9 |
| Reduviidae | <i>Sinea diadema</i> | | 9 |
| Saldidae | <i>Micracanthia fennica</i> | | 9 |
| Theridilidae/ Araneida | <i>Latrodectus hesperus</i> | | 9 |
| Thyreocoridae | <i>Corimelaena extensa</i> | | 9 |
| Tingidae | <i>Corythucha immaculata</i> | | 9 |
| Vespidae | <i>Vespula pensylvanica</i> | Western yellow jacket | 9 |
| Anthocoridae | <i>Orius tristicolor</i> | | 11 |
| Cimicidae | <i>Cimex latipennis</i> | | 11 |
| Miridae | <i>Adelphocoris superbus</i> | | 11 |

* - Versatility rating denotes the number of other structural stages used by the species (11 maximum).

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| 1 | <i>Leptocarpus</i> | <i>Leptocarpus</i> |
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| 10 | <i>Leptocarpus</i> | <i>Leptocarpus</i> |
| 11 | <i>Leptocarpus</i> | <i>Leptocarpus</i> |
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| 99 | <i>Leptocarpus</i> | <i>Leptocarpus</i> |
| 100 | <i>Leptocarpus</i> | <i>Leptocarpus</i> |

1 - Volatility rating based on the number of other structural stages used by the species (1 maximum).

Appendix VERTCAND. Summaries of vertebrate species with USFWS Candidate C1 or C2 status.

Larch Mountain salamander. Primarily a species found west of the Cascade crest in Washington and Oregon with few reports east of the Cascades. Primary habitat is moist talus associated with late succession coniferous forests. Threats to the species can be as a result of disturbance of suitable talus through mining activities (for road construction or other gravel sources) or trail and road construction. Disturbance of the talus during survey for the presence of salamanders can also result in drying out of the talus and reduction of prey.

Western toad. Widespread across the CRB. Habitat is near wetlands, marshes and small ponds associated with dry forests or "shrubby" areas. Reported to be declining in parts of the range, e.g. southern Idaho, but populations seem stable in other areas. Development, including channelization of low elevation wet areas result in loss of habitat. Increases in ultraviolet radiation may also be a problem. Breeding habitat may be lost as a result of dam construction. Prior to dams, high water flows formed breeding pools when the water receded, regulated river flows as a result of dams prevent these habitats from forming.

Red-legged frog.

Tailed frog.

Cascades frog. Range overlaps with spotted frog and the two may compete and hybridize in some locations. They are most common in small pools adjacent to streams flowing through subalpine meadows. The species may be locally abundant but also absent from habitat that appears to be suitable. Introduction of predatory fish into frog breeding areas have been recognized as possible threats to the population. Increases in ultraviolet radiation and effects on embryos is a possible threat. Livestock grazing may have an adverse effect on vegetation associated with breeding areas, but little work has been completed to document the effects.

Spotted frog. Populations east of the Cascades in Washington appear stable, but in Utah, Nevada and southwestern Idaho populations have declined. There have been proposals to divide the species into two, recognizing the difference between east and west of the Cascades.

Threats to the populations in southwestern Idaho include grazing, resulting from reduction of cover associated with wetlands and effects of urine and feces on water quality where cattle concentrations occur in riparian areas. Loss of habitat as a result of development and fragmentation of habitat which results in disruptions in movements within home ranges (between hibernaculum and breeding grounds). Springs are an important habitat, providing sites for hibernacula. Development of the spring may prevent the use of the area by frogs since the natural surface flow (point where frogs enter to hibernate) is eliminated. Conversion of wetlands to irrigated pastures. Road construction presents threats in a variety of ways: direct loss of habitat to the road or during construction, traffic on roads results in direct mortality, roads may present barriers to movements and roads may contribute to increased sedimentation which degrades habitat. Construction of dams may permanently flood breeding sites above dams and because of regulated flows below the dam alter the seasonal high waters and prevent formation of pools suitable for breeding. Introduction of bullfrogs and fish, not native to the area, increases predation and has been detrimental to many species of amphibians.

Western least bittern.

Smallmouth Bass. Primarily a species found west of the Cascade crest in Washington and Oregon with few reports east of the Cascades. Primarily habitat is water bodies associated with late succession montane forests. Threats to the species can be as a result of disturbance of suitable habitat through mining activities (for road construction or other gravel sources) or (less) and road construction. Disturbance of the habitat during survey for the presence of salmonids can also result in drying out of the river and reduction of flow.

Spotted Frog. Distributed across the PNW. Habitat is near wetlands, marshes and small ponds associated with dry forests or "shrubby" areas. Reported to be declining in parts of the range, e.g. southern Idaho, but populations seem stable in other areas. Development, including channelization of low elevation wet areas result in loss of habitat. Increases in microclimate radiation may also be a problem. Breeding habitat may be lost as a result of dam construction. Ponds to which high water flows toward breeding pools when the water recedes, receding river flows as a result of dam prevent these habitats from forming.

Red-legged Frog

Tailed Frog

Scrubland Frog. Range overlaps with spotted frog and the two may compete and hybridize in some locations. They are most common in small ponds adjacent to streams flowing through subalpine meadows. The species may be locally abundant but also absent from habitat that appears to be suitable. Introduction of predatory fish into frog breeding areas have been recognized as possible threats to the population. Increases in microclimate radiation and effects on amphibians is a possible threat. However, grazing may have an adverse effect on vegetation associated with breeding areas, but little work has been completed to document the effects.

Spotted Frog. Populations east of the Cascades in Washington appear stable. But in Utah, Nevada and southwestern Idaho populations have declined. There have been proposals to divide the species into two, recognizing the difference between east and west of the Cascades.

Threats to the population in southwestern Idaho include grazing, resulting from reduction of cover associated with wetlands and effects of urban and forest on water quality where cattle concentrations occur in riparian areas. Loss of habitat as a result of development and fragmentation of habitat which results in disruption of movement within some ranges (between submontane and montane forests). Grazing and an important habitat, providing areas for riparianity. Development of the spring may prevent the use of the area by frogs along the riparian surface flow (which enters the riparian area) is eliminated. Construction of wetlands to irrigated pastures. Road construction presents threats in a variety of ways: direct loss of habitat to the road or during construction, effects on roads result in direct mortality, roads may prevent habitat for movement and roads may contribute to increased fragmentation with various threats. Construction of dams may permanently flood breeding areas and because of regulated flows below the dam alter the seasonal high water and prevent formation of pools suitable for breeding. Introduction of bullfrogs and fish, not native to the area, increases predation and has been detrimental to many species of amphibians.

Western Tarsal Bat

White-faced ibis.

Trumpeter swan. A translocation effort was initiated in 1990 for southern Oregon, southeastern Idaho and western Wyoming. The primary wintering areas are in eastern Idaho and southwestern Montana and wintering populations have increased from approximately 200 in the 1930s to over 2500 in 1995. The Tri-State flock (Oregon, Idaho and Montana) increased as a result of artificial feeding, habitat protection and reduction in hunting. Between 1990 and 1994 the breeding population declined by approximately 50% and it was speculated as a result of terminating the artificial feeding program and translocations.

The primary threat to the population is habitat conversion from wetlands to agriculture or other uses. Disturbance of incubating females from nests leaving the nest unattended and vulnerable to predation and temperature fluctuations. Lead poisoning has been a problem in some areas. Mis-identification of trumpeters for tundra swans and direct killing has also been a problem.

Harlequin duck. Status in western states has been reported as stable to declining.

Northern goshawk. Population status of the goshawk is not clearly defined. Historical distribution and distribution is also poorly understood and few records or nest site locations were known prior to the 1960s (Thomas, et. al. 1995). The species was listed as a Candidate 2 species in 1992 (Fed. Register, Vol 57 #123) primarily as a result habitat alteration of primary habitat, late succession montane forests.

Habitat modification of nesting and/or foraging habitat is the primary threat for goshawks. This includes direct destruction of nest trees or reducing stem density or canopy closure. Long-term fire suppression with potential result of stand replacement fires in vegetation communities which historically had frequent low intensity fires is also a threat for habitat alteration. In some areas livestock grazing has had adverse consequences to goshawks by reducing aspen regeneration (affecting potential nesting habitat) and alters forest understory vegetation which effects prey and hunting ability. Livestock use in riparian areas by removing or altering vegetation species composition and distribution also influences nesting and foraging habitat..

Ferruginous hawk. Populations have increased in parts of Montana, but decreased in Idaho. It is considered a threatened species in Canada..

Threats are conversion of native areas, grasslands and shrub-steppe, to agriculture. Egg contamination with pesticides, organophosphates, PCBs and mercury have been reported for the species. Overuse by livestock can result in loss of foraging or nesting habitat..

Western sage grouse. In both Washington and Oregon populations have declined in the past several decades. In Washington, only two population centers remain: northwestern Douglas County and the Yakima Firing Range in Kittitas and Yakima counties (each with approximately 300 birds) (Tirhi 1994). A 42% decrease in numbers of sage grouse using between 14 and 20 leks were monitored was reported in Oregon between 1988 and 1993 (USDI, BLM 1994). It is not clear whether this is a distinct subspecies and different from populations in Montana and Idaho, where populations have not declined as dramatically.

Threats to the Washington and Oregon populations are primarily conversion of shrub-steppe habitat to agriculture and residential/urban development. Recreational hunting, during declining populations can further reduce numbers. Livestock grazing can alter shrub-steppe communities and result in less

Wetland-dependent birds A population of 1990 for southern Oregon, southeastern Idaho and western Wyoming. The primary wetland areas are in eastern Idaho and southeastern Montana and surrounding populations have increased from approximately 100 in the 1980s to over 200 in 1990. The 1990-1991 (Oregon, Idaho and Montana) increased as a result of artificial wetland creation and reduction in hunting. Between 1980 and 1990 the breeding population declined by approximately 50% and it was speculated as a result of deteriorating the artificial wetland program and translocations.

The primary threat to the population is habitat conversion from wetlands to agriculture or other uses. Disturbance of incubating females from nests leaving the nest unprotected and vulnerable to predation and temperature fluctuations. Lead poisoning has been a problem in some areas. The identification of translocated for female means and direct killing has also been a problem.

Wetland-dependent birds Status in western states has been reported as stable to declining.

Wetland-dependent birds Population status of the hawk is not clearly defined. Historical distribution and distribution is also poorly understood and few records or nest site locations were known prior to the 1980s (Thomas, et al. 1982). The species was listed as a Candidate S species in 1982 (Fed. Register, Vol 47 8123) primarily as a result of habitat alteration of primary habitat, late succession montane forests.

Habitat modification of nesting and/or foraging habitat is the primary threat for this species. This includes direct destruction of nest trees or reducing them density or canopy closure. Long-term this suppression with potential result of severe replacement of trees in vegetation communities which historically had historic low frequency of fires also a threat for habitat alteration. In some areas livestock grazing has had adverse consequences to grasslands by reducing open regeneration (altering potential nesting habitat) and altering forest understory vegetation which affects prey and brooding ability. Livestock use in riparian areas removal of riparian vegetation species composition and distribution also influences nesting and foraging habitat.

Wetland-dependent birds Populations have increased in parts of Montana, but decreased in Idaho. It is considered a threatened species in Canada.

Threats are conversion of native grass, grasslands and shrub-steppe, to agriculture. By conversion with pesticides, herbicides, and other chemicals. Wetlands have been reported for the species. Overuse by livestock as result in loss of foraging or nesting habitat.

Wetland-dependent birds In both Washington and Oregon populations have declined in the past several decades. In Washington, only two population centers remain: the Okanogan River and the Yakima River Range in Kittitas County. In the Okanogan River Range (with approximately 300 birds) (Wright 1994). A 40% decline in number of birds was reported between 1980 and 1990 (Wright 1994). It is not clear whether this is a localized phenomenon and different from populations in Montana and Idaho, where populations have not declined as dramatically.

Threats to the Washington and Oregon populations are primarily conversion of shrub-steppe habitat to agriculture and residential/urban development. Intentional hunting, during declining populations can further reduce numbers. Livestock grazing can alter shrub-steppe communities and result in loss

suitable habitat. Conversion of shrub-steppe to livestock forage species has contributed to declines of sage grouse. Pesticide use can influence insect populations important to young sage grouse.

Columbian sharp-tailed grouse. In Washington numbers of males on leks declined from 13 in 1954 to 5 in 1994 and numbers of leks declined 46%, 65% and 61% in Douglas, Okanogan and Lincoln counties respectively (Tirhi 1994). Populations have declined in Oregon and native populations may be extirpated. Restoration efforts through translocation efforts in Oregon have been largely unsuccessful.

As with sage grouse the primary threat is conversion of shrub-steppe habitat to agriculture or residential/urban development. Recreational hunting during declining population levels likely contributed to declines.

Black tern.

Burrowing owl.

Olive-sided flycatcher.

Willow flycatcher.

Loggerhead shrike.

Tricolored blackbird.

Preble's shrew.

Spotted bat.

Western small-footed myotis.

Long-eared myotis.

Fringed myotis.

Long-legged myotis.

Yuma myotis.

Pale western big-eared bat.

Pygmy rabbit. The population in eastern Washington has declined to only 5 populations in Douglas County.

The primary threat is conversion of sagebrush communities to agriculture, including livestock pastures and other losses, such as flooding as a result of dam construction.

Idaho ground squirrel.

Washington ground squirrel.

Potholes meadow vole.

Wolverine. Wolverine were petitioned to be listed as threatened under ESA. The status was determined not warranted. Wolverines historically were widespread, but in low densities. Even where relatively abundant, they are difficult to observe and frequency of wolverine reports may be more related to human activity than to wolverine population density (Banci 1994).

Large, unroaded areas for seclusion are required for wolverine persistence. Rooding and increasing human activity into these areas is the primary threat. It is speculated that roads, at least higher traffic volume or multi-land roads, may be barriers to movement. Alteration of large refugia with intrusions of roads presents the largest threat to wolverine populations. Winter recreation, including snowmobiling and backcountry skiing, may result in displacement of females with young from rendezvous sites or from food caches.

Lynx. Lynx were petitioned to be listed as threatened in northcentral Washington under ESA. A determination of not warranted was made based on connection with a stable population in British Columbia and known emigration between the US and Canada. A followup petition for listing was made based on range-wide declines and concern for lynx. Recommendations by segments of the Fish and Wildlife Service as well as other biologists familiar with lynx were for listing, at least over portions of their range. Oregon Department of Fish and Wildlife consider lynx extirpated from the state, although an individual lynx was trapped in Oregon in 1993. Montana and Idaho have restricted trapping quotas for lynx.

Trapping, fire suppression and forest management pose threats to the population as do increased road access to unroaded areas and winter recreation. Most lynx populations in the CRB are peninsular extensions of suitable lynx habitat in Canada and fragmenting the habitat presents conservation threats.

Pacific fisher. Human activities, particularly trapping and forest management, have contributed to declines in fisher populations in western states, including the CRB (Powell and Zielinski 1994). Aubry and Houston (1992) reported fishers may be on the edge of extinction in Washington. Reports in southern Oregon during the past 5 years; presently research studies are underway to better understand fisher ecology in Oregon. Fishers have been augmented in Idaho and Montana and continue to be trapped in Montana.

Changes in forest structure are the primary threat to fisher persistence. Increases in road density may contribute to disturbance to fishers. Fragmentation of forests may result in isolated populations. Trapping contributes to population declines. Fisher may be taken inadvertently during trapping for American marten.

Sagebrush lizard.

Appendix CARNIV. Legal status and harvest summaries of vertebrate carnivores in the interior CRB Assessment Area.

| SPECIES/AREA | CLASSIFICATION | STATUS | HARVEST (YEAR) | HARVEST TREND |
|----------------------|------------------|----------------------------------|----------------------------|----------------------------------|
| WOLF | | | | |
| Eastern OR | Game Mammal | Protected | No harvest | — |
| Eastern WA | Game Mammal | Protected | No harvest | — |
| ID | Game Mammal | Protected | No harvest | — |
| Northwest MT | Game Mammal | Protected | No harvest | Occasional Incidental Take |
| COYOTE | | | | |
| Eastern OR | Predatory Mammal | Unprotected | 4500 (1994-1995) | Stable/Increasing (1985-1995) |
| Eastern WA | Predatory Mammal | Unprotected | 1415 (1993-1994) | Stable/Increasing (1983-1994) |
| ID | Predatory Mammal | Unprotected | 1825 (1993-1994) | Stable/Decreasing (1984-1994) |
| Northwest MT | Predatory Mammal | Unprotected | 1198 (1993-1994) | Stable (1984-1994) |
| LYNX | | | | |
| Eastern OR | Furbearer | Protected (extirpated) | No Harvest | — |
| Eastern WA | Furbearer | Protected (regulated harvest) | No Harvest (since 1991) | Decreasing (1970-1991) |
| ID | Furbearer | Regulated Harvest (quota) | 1 (1993-1994) | Decreasing (1984-1994) |
| Northwest MT | Furbearer | Regulated Harvest (quota) | 4 (1994-1995) | Decreasing (1984-1995) |
| MOUNTAIN LION | | | | |

| | | | | |
|--------------|-------------|----------------------|---------------------|----------------------------------|
| Eastern OR | Game Mammal | Regulated harvest | 93 (1992) | Increasing (1970-1992) |
| Eastern WA | Game Mammal | Regulated harvest | 148 (1994-19945) | Increasing (1989-1995) |
| ID | Game Mammal | Regulated harvest | 448 (1993-1994) | Stable/Increasing (1988-1994) |
| Northwest MT | Game Mammal | Regulated harvest | 258 (1993-1994) | Increasing (1984-1994) |

BLACK BEAR

| | | | | |
|--------------|-------------|----------------------|-----------------------|----------------------------------|
| Eastern OR | Game Mammal | Regulated harvest | approx. 270 (1994) | Stable (1975-1992) |
| Eastern WA | Game Mammal | Regulated harvest | 781 (1992-1993) | Stable (1984-1993) |
| ID | Game Mammal | Regulated harvest | 1231 (1993--1994) | Stable/Increasing (1983-1994) |
| Northwest MT | Game Mammal | Regulated harvest | approx. 750 1993 | Stable (1986-1993) |

GRIZZLY BEAR

| | | | | |
|--------------|-------------|---------------------------|------------|----------------------------|
| Eastern OR | Game Mammal | Protected (Extirpated) | No harvest | — |
| Eastern WA | Game Mammal | Protected | No harvest | — |
| ID | Game Mammal | Protected | No harvest | — |
| Northwest MT | Game Mammal | Protected | No harvest | Occasional Incidental Take |

FISHER

| | | | | |
|--------------|-----------|------------------------------|----------------------------|----------------------------|
| Eastern OR | Furbearer | Protected | No harvest (since 1932) | — |
| Eastern WA | Furbearer | Protected | No harvest | — |
| ID | Furbearer | Protected | No harvest | Occasional incidental take |
| Northwest MT | Furbearer | Regulated harvest (quota) | 8 (1994-1995) | Stable (1984-1995) |

MARTEN

| | | | | |
|--------------|-----------|-------------------|--------------------|---------------------------|
| Eastern OR | Furbearer | Regulated harvest | 10 (1994-1995) | Decreasing (1985-1995) |
| Eastern WA | Furbearer | Regulated harvest | 40 (1993-1994) | Decreasing (1983-1994) |
| ID | Furbearer | Regulated harvest | 364 (1993-1994) | Decreasing (1984-1994) |
| Northwest MT | Furbearer | Regulated harvest | 631 (1993-1994) | Decreasing (1984-1994) |

WOLVERINE

| | | | | |
|--------------|-----------|-------------------|------------------|----------------------------|
| Eastern OR | Furbearer | Protected | No harvest | — |
| Eastern WA | Furbearer | Protected | No harvest | — |
| ID | Furbearer | Protected | No harvest | Occasional incidental take |
| Northwest MT | Furbearer | Regulated harvest | 3 (1994-1995) | Stable (1984-1995) |

RIVER OTTER

| | | | | |
|--------------|-----------|-------------------|-------------------|----------------------------------|
| Eastern OR | Furbearer | Regulated harvest | 84 (1994-1995) | Stable (1985-1995) |
| Eastern WA | Furbearer | Regulated harvest | 35 (1993-1994) | Stable/increasing (1983-1994) |
| ID | Furbearer | Protected | No harvest | Occasional incidental take |
| Northwest MT | Furbearer | Regulated harvest | 26 (1994-1995) | Stable (1984-1994) |

Appendix UNGULATES. Summary of management issues and key environmental correlates for 6 species of ungulates.

Information extracted from longer reports. Authors for the primary material were:

Elk:

Alan G. Christensen, USDA Forest Service, Region 1
L. Jack Lyon, USDA, Forest Service, Intermountain Res.Sta.

Mule deer and White-tailed deer:

Richard Pedersen, USDA Forest Service, Region 6

Bighorn sheep:

Walt L. Bodie, State of Idaho, Dept.of Game and Fish

Mountain goat:

Rolf Johnson, State of Washington, Dept.of Fish & Wildlife

Pronghorn (Antelope):

Bart O'Gara, USDI, Fish and Wildlife Service (retired)

Caribou:

Paul Harrington, USDA Forest Service, Idaho Panhandle
National Forests

SPECIES

ISSUES

CORRELATES

ELK

Road Access

Road Density/occurrence
Open road density by season
summer/fall range
roadless areas

Vegetation Manipulation
(Habitat Components)

Forested Acres
Non-forested acres
summer/fall range
acres logged annually
acres burned annually
acres grazed (cattle allotments)

Grazing

Summer/fall range
Cattle Allotments
Primary Range

Security/refugia

Roadless areas
Conifer Forest/patch Size
Terrain Features
Road densities
Proximity to Human Development

Winter Range

Aspect
Elevation
Snow Depth
Ownership patterns

Fire Management

Summer/fall Range
Winter Range
Wilderness fire plans
fuel/fire models
terrain features

Vulnerability

Summer/fall range
Open road density
State management Guidelines
Forested Acres

Game Farms

Game Farm Locations

Models/guidelines

Cover/vegetation

Appendix 1. Summary of management issues and key environmental
concerns for 6 species of ungulates.

Information extracted from longer reports. Authors for the primary material
are:

Alan C. Calkins, USDA Forest Service, Region 1
J. Jack Lynn, USDA Forest Service, Intermountain West
Boris G. and Boris-Larissa G.
Richard Robinson, USDA Forest Service, Region 2
Richard G. Robinson
Walt J. Hobbs, State of Idaho, Dept. of Game and Fish
Monte L. Goss
Bill Johnson, State of Washington, Dept. of Fish & Wildlife
Ecological Services
Burt G. Hall, USDA, Fish and Wildlife Service (retired)
Cathryn
Paul Robinson, USDA Forest Service, Idaho Panhandle
National Forest

| Species | Range | Comments |
|----------------------|-------------|--|
| Elk | East Forest | Open and heavily by season management areas |
| Mountain goat | West Forest | Open and heavily by season management areas |
| Porcupine | West Forest | Open and heavily by season management areas |
| Beaver | West Forest | Open and heavily by season management areas |
| Wolverine | West Forest | Open and heavily by season management areas |
| Grizzly bear | West Forest | Open and heavily by season management areas |
| Black bear | West Forest | Open and heavily by season management areas |
| Wolf | West Forest | Open and heavily by season management areas |
| Coon | West Forest | Open and heavily by season management areas |
| Badger | West Forest | Open and heavily by season management areas |
| Skunk | West Forest | Open and heavily by season management areas |
| Possum | West Forest | Open and heavily by season management areas |
| Arctic fox | West Forest | Open and heavily by season management areas |
| Red fox | West Forest | Open and heavily by season management areas |
| Gray fox | West Forest | Open and heavily by season management areas |
| Striped skunk | West Forest | Open and heavily by season management areas |
| Spotted skunk | West Forest | Open and heavily by season management areas |
| Ring-necked pheasant | West Forest | Open and heavily by season management areas |
| Partridge | West Forest | Open and heavily by season management areas |
| Quail | West Forest | Open and heavily by season management areas |
| Chukar | West Forest | Open and heavily by season management areas |
| Bobwhite | West Forest | Open and heavily by season management areas |
| Guinea fowl | West Forest | Open and heavily by season management areas |
| Indian peafowl | West Forest | Open and heavily by season management areas |
| Swamp sparrow | West Forest | Open and heavily by season management areas |
| Marsh wren | West Forest | Open and heavily by season management areas |
| Yellowthroat | West Forest | Open and heavily by season management areas |
| Indigo bunting | West Forest | Open and heavily by season management areas |
| Scarlet tanager | West Forest | Open and heavily by season management areas |
| Summer tanager | West Forest | Open and heavily by season management areas |
| Winter tanager | West Forest | Open and heavily by season management areas |
| Spotted tanager | West Forest | Open and heavily by season management areas |
| White tanager | West Forest | Open and heavily by season management areas |
| Black tanager | West Forest | Open and heavily by season management areas |
| Red tanager | West Forest | Open and heavily by season management areas |
| Blue tanager | West Forest | Open and heavily by season management areas |
| Green tanager | West Forest | Open and heavily by season management areas |
| Yellow tanager | West Forest | Open and heavily by season management areas |
| Orange tanager | West Forest | Open and heavily by season management areas |
| Pink tanager | West Forest | Open and heavily by season management areas |
| Light tanager | West Forest | Open and heavily by season management areas |
| Dark tanager | West Forest | Open and heavily by season management areas |
| White tanager | West Forest | Open and heavily by season management areas |
| Black tanager | West Forest | Open and heavily by season management areas |
| Red tanager | West Forest | Open and heavily by season management areas |
| Blue tanager | West Forest | Open and heavily by season management areas |
| Green tanager | West Forest | Open and heavily by season management areas |
| Yellow tanager | West Forest | Open and heavily by season management areas |
| Orange tanager | West Forest | Open and heavily by season management areas |
| Pink tanager | West Forest | Open and heavily by season management areas |
| Light tanager | West Forest | Open and heavily by season management areas |
| Dark tanager | West Forest | Open and heavily by season management areas |

ORV's

Recreation

Tribal Relationships

Land Ownership

MULE DEER

Forage

Snow depth

Competition with livestock

Fire management

Logging

Urban development

Road access

Poaching

Domestic dogs

Highways

Vehicle mortality

WHITE-TAILED DEER

Forage

Snow depth

Competition

Roads/access
State Guidelines
Bull:cow ratios
Hunter density/seasons

Road Density

Terrain Features
Forested Acres
summer/fall ranges
Winter Range

Road Density

Trails/campsites
Developed recreation sites
Seasons of use by humans
Summer/fall range
Human densities

Tribal ownership patterns

Treating hunting rights boundaries
Proximity of Public lands
Summer/fall range
Winter range
Road Densities

Ownership Patterns

Private/corporate management
summer/fall range
winter range

acres logged annually

acres burned annually
miles of road on winter range
human population density

snow depth 20 inches

acres of sheep allotments

acres of cattle allotments

acres prescribed fire

acres wild fire

acres logged

Human population density

road density

none suggested

Road density

Human population density

none suggested

Shrub fields

riparian zone
abandoned farm fields

snow depth 20 inches

Moose range

Livestock allotments
Elk winter range

Food/foodstuffs
Foodstuffs
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| | |
|-------------------|--|
| Fire management | acres prescribed fire acres wild fire |
| Logging | acres logged, last 3-5 yrs |
| Urban development | Human population density Homes/cabin density adjacent to federal lands Recreation sites/mile of riparian Seasonal use at recreation sites Road density |
| Farm practices | acres of specific croplands ratio of agricultural land to successional habitat |
| Road access | Road density |
| Poaching | Road density Human population density |
| Domestic dogs | none suggested |
| Highways | |
| Vehicle mortality | |

BIGHORN SHEEP

| | |
|-------------------------|---|
| Diseases | Domestic sheep allotments Livestock Allotments |
| Grazing | none suggested |
| Vegetation Manipulation | Seasonal Ranges Mixed shrub/grasslands Shrublands Potential habitat |
| Human Disturbance | Escape terrain Proximity to humans Seasonal Ranges |
| Vacant Habitat | Suitable habitat Domestic sheep allotments |
| Key Habitats | Winter range |
| Wilderness Management | Wilderness Management Amount of habitat Aircraft Acces |
| Models | Topographic features Escape Terrain Human Activies Centers Bighorn population paramaters |

MOUNTAIN GOAT

| | |
|-----------------------|---|
| Road Access | Road Density Proximity to escape terrain Winter open road density |
| Vegetation Management | Cover/forage ratios Road density Proximity to escape terrain |
| Security | Proximity to escape terrain Road Density |
| Winter Range | Juxtaposition to winter range Rock/cliff habitat |
| Fire Management | Let burn policy |

Prescribed burns

| | |
|-----------------------------|--|
| Harvest Management | (none identified) |
| Predator/Prey Relationships | (none identified) |
| Competition (forage) | (none identified) |
| Recreation | Subdivision/summer cabins Destination ski resorts |

PRONGHORN ANTELOPE

| | |
|---|---|
| Fencing | Livestock grazing allotments |
| Livestock grazing on rangeland shared with pronghorn | Livestock grazing allotments Spring range |
| Predation and food for carnivores | Coyote populations Golden eagle Bobcat Mountain lion |
| Improving degraded rangeland | Sub-climax vegetation Shrub encroachment |
| Habitat Models | Grass/forbs in spring Subclimax vegetation |
| Habitat Parameters favoring pronghorn | -low rolling to flat terrain -20-38 cm precipitation -snow depths under 30cm -grass/forb rangelands, <45 cm -open water sources |

MOUNTAIN CARIBOU

| | |
|--------------------------|---|
| Late Successional Stands | Western Cedar/Hemlock Englemann spruce/subalpine fir Ecotone habitat Acres of potential old-growth |
| Human Disturbance | Groomed Snowmobile trails Open Alpine assessable areas |
| Fire | Access management Acres of non-target stands |
| Herd Augmentation | Public Acceptance Animal availability |
| Direct Mortality | Predator control Access management Law enforcement Public education |

Appendix VERTHERB. Vertebrate species using open and closed grassland/herb structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project.

| Family | Scientific name | Common name | Versa- tality |
|------------------|---|-------------------------------|------------------|
| Ardeidae | <i>Bubulcus ibis</i> | Cattle egret | 0 |
| Gruidae | <i>Grus canadensis tabida</i> | Greater sandhill crane | 0 |
| Passeridae | <i>Passer domesticus</i> | House sparrow | 0 |
| Phasianidae | <i>Colinus virginianus</i> | Northern bobwhite | 0 |
| Phasianidae | <i>Phasianus colchicus</i> | Ring-necked pheasant | 0 |
| Muridae | <i>Mus musculus</i> | House mouse | 0 |
| Sciuridae | <i>Sciurus niger</i> | Eastern fox squirrel | 0 |
| Emberizidae | <i>Dolichonyx oryzivorus</i> | Bobolink | 1 |
| Strigidae | <i>Athene cunicularia</i> | Burrowing owl | 1 |
| Falconidae | <i>Falco mexicanus</i> | Prairie falcon | 2 |
| Falconidae | <i>Falco rusticolus</i> | Gyr falcon | 2 |
| Fringillidae | <i>Leucosticte tephrocotis</i> | Gray-crowned rosy finch | 2 |
| Motacillidae | <i>Anthus rubescens</i> | American pipit | 2 |
| Phasianidae | <i>Tympanuchus phasianellus columbianus</i> | Columbian sharp-tailed grouse | 2 |
| Strigidae | <i>Asio flammeus</i> | Short-eared owl | 2 |
| Strigidae | <i>Nyctea scandiaca</i> | Snowy owl | 2 |
| Heteromyidae | <i>Perognathus longimembris</i> | Little pocket mouse | 2 |
| Vespertilionidae | <i>Pipistrellus hesperus</i> | Western pipistrelle | 2 |
| Colubridae | <i>Sonora semiannulata</i> | Ground snake | 2 |
| Iguanidae | <i>Crotaphytus bicinctores</i> | Mojave black-collared lizard | 2 |
| Accipitridae | <i>Circus cyaneus</i> | Northern harrier | 3 |
| Emberizidae | <i>Amphispiza belli</i> | Sage sparrow | 3 |
| Emberizidae | <i>Passerculus sandwichensis</i> | Savannah sparrow | 3 |
| Hirundinidae | <i>Tachycineta bicolor</i> | Tree swallow | 3 |
| Bovidae | <i>Bos bison</i> | American bison | 3 |
| Canidae | <i>Urocyon cinereoargenteus</i> | Common gray fox | 3 |
| Canidae | <i>Vulpes velox</i> | Kit fox | 3 |
| Molossidae | <i>Tadarida brasiliensis</i> | Brazilian free-tailed bat | 3 |
| Ochotonidae | <i>Ochotona princeps</i> | American pika | 3 |
| Soricidae | <i>Sorex merriami</i> | Merriam's shrew | 3 |
| Talpidae | <i>Scapanus latimanus</i> | Broad-footed mole | 3 |
| Accipitridae | <i>Buteo swainsoni</i> | Swainson's hawk | 4 |
| Emberizidae | <i>Ammodramus savannarum</i> | Grasshopper sparrow | 4 |
| Emberizidae | <i>Amphispiza bilineata</i> | Black-throated sparrow | 4 |
| Falconidae | <i>Falco sparverius</i> | American kestrel | 4 |
| Sciuridae | <i>Marmota caligata</i> | Hoary marmot | 4 |
| Sciuridae | <i>Spermophilus brunneus</i> | Idaho ground squirrel | 4 |

| | | | |
|----------------|-------------------------------------|--------------------------------|---|
| Apodidae | <i>Chaetura vauxi</i> | Vaux's swift | 5 |
| Emberizidae | <i>Poocetes gramineus</i> | Vesper sparrow | 5 |
| Emberizidae | <i>Sturnella neglecta</i> | Western meadowlark | 5 |
| Mimidae | <i>Oreoscoptes montanus</i> | Sage thrasher | 5 |
| Phasianidae | <i>Dendragapus obscurus</i> | Blue grouse | 5 |
| Cervidae | <i>Rangifer tarandus caribou</i> | Woodland caribou | 5 |
| Geomyidae | <i>Thomomys bottae</i> | Botta's pocket gopher | 5 |
| Heteromyidae | <i>Dipodomys californicus</i> | California kangaroo rat | 5 |
| Sciuridae | <i>Spermophilus armatus</i> | Uinta ground squirrel | 5 |
| Iguanidae | <i>Gambelia wislizenii</i> | Longnose leopard lizard | 5 |
| Ambystomatidae | <i>Ambystoma gracile</i> | Northwestern salamander | 6 |
| Accipitridae | <i>Buteo lagopus</i> | Rough-legged hawk | 6 |
| Emberizidae | <i>Geothlypis trichas</i> | Common yellowthroat | 6 |
| Emberizidae | <i>Spizella breweri</i> | Brewer's sparrow | 6 |
| Hirundinidae | <i>Progne subis</i> | Purple martin | 6 |
| Laniidae | <i>Lanius excubitor</i> | Northern shrike | 6 |
| Phasianidae | <i>Alectoris chukar</i> | Chukar | 6 |
| Phasianidae | <i>Callipepla californica</i> | California quail | 6 |
| Phasianidae | <i>Callipepla gambelii</i> | Gambel's quail | 6 |
| Phasianidae | <i>Perdix perdix</i> | Gray partridge | 6 |
| Picidae | <i>Melanerpes lewis</i> | Lewis' woodpecker | 6 |
| Picidae | <i>Sphyrapicus thyroideus</i> | Williamson's sapsucker | 6 |
| Troglodytidae | <i>Catherpes mexicanus</i> | Canyon wren | 6 |
| Troglodytidae | <i>Salpinctes obsoletus</i> | Rock wren | 6 |
| Antilocapridae | <i>Antilocapra americana</i> | Pronghorn | 6 |
| Bovidae | <i>Ovis canadensis californiana</i> | California bighorn sheep | 6 |
| Bovidae | <i>Ovis canadensis canadensis</i> | Rocky mountain bighorn sheep | 6 |
| Equidae | <i>Equus caballus</i> | Feral horse | 6 |
| Heteromyidae | <i>Dipodomys ordii</i> | Ord's kangaroo rat | 6 |
| Heteromyidae | <i>Perognathus parvus</i> | Great basin pocket mouse | 6 |
| Leporidae | <i>Sylvilagus floridanus</i> | Eastern cottontail | 6 |
| Leporidae | <i>Sylvilagus nuttallii</i> | Mountain cottontail | 6 |
| Muridae | <i>Neotoma lepida</i> | Desert woodrat | 6 |
| Muridae | <i>Onychomys leucogaster</i> | Northern grasshopper mouse | 6 |
| Muridae | <i>Peromyscus crinitus</i> | Canyon mouse | 6 |
| Muridae | <i>Phenacomys intermedius</i> | Heather vole | 6 |
| Sciuridae | <i>Ammospermophilus leucurus</i> | White-tailed antelope squirrel | 6 |
| Sciuridae | <i>Spermophilus beecheyi</i> | California ground squirrel | 6 |
| Sciuridae | <i>Spermophilus townsendii</i> | Townsend's ground squirrel | 6 |
| Sciuridae | <i>Spermophilus washingtoni</i> | Washington ground squirrel | 6 |
| Soricidae | <i>Sorex preblei</i> | Preble's shrew | 6 |
| Colubridae | <i>Masticophis taeniatus</i> | Striped whipsnake | 6 |

| | | | |
|------------------|--|-----------------------------|---|
| Colubridae | <i>Rhinocheilus lecontei</i> | Longnose snake | 6 |
| Iguanidae | <i>Phrynosoma douglassii</i> | Short-horned lizard | 6 |
| Iguanidae | <i>Phrynosoma platyrhinos</i> | Desert horned lizard | 6 |
| Iguanidae | <i>Uta stansburiana</i> | Side-blotched lizard | 6 |
| Scincidae | <i>Eumeces skiltonianus</i> | Western skink | 6 |
| Teiidae | <i>Cnemidophorus tigris</i> | Western whiptail | 6 |
| Teiidae | <i>Cnemidophorus velox</i> | Plateau striped whiptail | 6 |
| Pelobatidae | <i>Spea intermontana</i> | Great basin spadefoot | 7 |
| Accipitridae | <i>Accipiter striatus</i> | Sharp-shinned hawk | 7 |
| Emberizidae | <i>Vermivora ruficapilla</i> | Nashville warbler | 7 |
| Falconidae | <i>Falco columbarius</i> | Merlin | 7 |
| Hirundinidae | <i>Hirundo pyrrhonota</i> | Cliff swallow | 7 |
| Phasianidae | <i>Centrocercus urophasianus</i> | Sage grouse | 7 |
| Tyrannidae | <i>Sayornis saya</i> | Say's phoebe | 7 |
| Tyrannidae | <i>Tyrannus verticalis</i> | Western kingbird | 7 |
| Heteromyidae | <i>Dipodomys microps</i> | Chisel-toothed kangaroo rat | 7 |
| Heteromyidae | <i>Microdipodops megacephalus</i> | Dark kangaroo mouse | 7 |
| Leporidae | <i>Lepus townsendii</i> | White-tailed jackrabbit | 7 |
| Muridae | <i>Clethrionomys gapperi</i> | Southern red-backed vole | 7 |
| Sciuridae | <i>Marmota flaviventris</i> | Yellow-bellied marmot | 7 |
| Sciuridae | <i>Spermophilus columbianus</i> | Columbian ground squirrel | 7 |
| Accipitridae | <i>Aquila chrysaetos</i> | Golden eagle | 8 |
| Bombycillidae | <i>Bombycilla cedrorum</i> | Cedar waxwing | 8 |
| Columbidae | <i>Columba livia</i> | Rock dove | 8 |
| Emberizidae | <i>Chondestes grammacus</i> | Lark sparrow | 8 |
| Emberizidae | <i>Pheucticus melanocephalus</i> | Black-headed grosbeak | 8 |
| Emberizidae | <i>Seiurus noveboracensis</i> | Northern waterthrush | 8 |
| Laniidae | <i>Lanius ludovicianus</i> | Loggerhead shrike | 8 |
| Muscicapidae | <i>Catharus fuscescens</i> | Veery | 8 |
| Tyrannidae | <i>Empidonax oberholseri</i> | Dusky flycatcher | 8 |
| Tyrannidae | <i>Myiarchus cinerascens</i> | Ash-throated flycatcher | 8 |
| Tytonidae | <i>Tyto alba</i> | Common barn owl | 8 |
| Bovidae | <i>Oreamnos americanus</i> | Mountain goat | 8 |
| Geomyidae | <i>Thomomys mazama</i> | Western pocket gopher | 8 |
| Geomyidae | <i>Thomomys talpoides douglasi</i> | Brushprairie pocket gopher | 8 |
| Geomyidae | <i>Thomomys townsendii</i> | Townsend's pocket gopher | 8 |
| Mustelidae | <i>Mephitis mephitis</i> | Striped skunk | 8 |
| Sciuridae | <i>Spermophilus beldingi</i> | Belding's ground squirrel | 8 |
| Sciuridae | <i>Spermophilus elegans nevadensis</i> | Wyoming ground squirrel | 8 |
| Sciuridae | <i>Tamias minimus</i> | Least chipmunk | 8 |
| Vespertilionidae | <i>Antrozous pallidus</i> | Pallid bat | 8 |

| | | | |
|------------------|-----------------------------------|--|----|
| Iguanidae | <i>Sceloporus occidentalis</i> | Western fence lizard | 8 |
| Bufo | <i>Bufo woodhousii</i> | Woodhouse's toad | 9 |
| Accipitridae | <i>Buteo jamaicensis</i> | Red-tailed hawk | 9 |
| Emberizidae | <i>Passerina amoena</i> | Lazuli bunting | 9 |
| Emberizidae | <i>Spizella passerina</i> | Chipping sparrow | 9 |
| Fringillidae | <i>Carduelis tristis</i> | American goldfinch | 9 |
| Hirundinidae | <i>Hirundo rustica</i> | Barn swallow | 9 |
| Hirundinidae | <i>Tachycineta thalassina</i> | Violet-green swallow | 9 |
| Phasinaidae | <i>Oreortyx pictus</i> | Mountain quail | 9 |
| Tyrannidae | <i>Contopus sordidulus</i> | Western wood-pewee | 9 |
| Didelphidae | <i>Didelphis virginiana</i> | Virginia opossum | 9 |
| Geomyidae | <i>Thomomys talpoides</i> | Northern pocket gopher | 9 |
| Geomyidae | <i>Thomomys talpoides limosus</i> | White salmon pocket gopher | 9 |
| Leporidae | <i>Lepus americanus</i> | Snowshoe hare | 9 |
| Muridae | <i>Reithrodontomys megalotis</i> | Western harvest mouse | 9 |
| Procyonidae | <i>Procyon lotor</i> | Common raccoon | 9 |
| Sciuridae | <i>Spermophilus saturatus</i> | Cascade golden-mantled ground squirrel | 9 |
| Vespertilionidae | <i>Myotis evotis</i> | Long-eared myotis | 9 |
| Vespertilionidae | <i>Myotis thysanodes</i> | Fringed myotis | 9 |
| Anguidae | <i>Elgaria multicarinata</i> | Southern alligator lizard | 9 |
| Boidae | <i>Charina bottae</i> | Rubber boa | 9 |
| Colubridae | <i>Diadophis punctatus</i> | Ringneck snake | 9 |
| Colubridae | <i>Pituophis catenifer</i> | Gopher snake | 9 |
| Plethodontidae | <i>Ensatina eschscholtzii</i> | Ensatina | 10 |
| Accipitridae | <i>Buteo regalis</i> | Ferruginous hawk | 10 |
| Apodidae | <i>Cypseloides niger</i> | Black swift | 10 |
| Charadriidae | <i>Charadrius vociferus</i> | Killdeer | 10 |
| Corvidae | <i>Corvus brachyrhynchos</i> | American crow | 10 |
| Cuculidae | <i>Coccyzus americanus</i> | Yellow-billed cuckoo | 10 |
| Emberizidae | <i>Junco hyemalis</i> | Dark-eyed junco | 10 |
| Emberizidae | <i>Passerella iliaca</i> | Fox sparrow | 10 |
| Emberizidae | <i>Vermivora celata</i> | Orange-crowned warbler | 10 |
| Emberizidae | <i>Zonotrichia leucophrys</i> | White-crowned sparrow | 10 |
| Emberizidae | <i>Zonotrichia querula</i> | Harris' sparrow | 10 |
| Falconidae | <i>Falco peregrinus</i> | Peregrine falcon | 10 |
| Hirundinidae | <i>Stelgidopteryx serripennis</i> | Northern rough-winged swallow | 10 |
| Strigidae | <i>Otus kennicottii</i> | Western screech owl | 10 |
| Trochilidae | <i>Archilochus alexandri</i> | Black-chinned hummingbird | 10 |
| Trochilidae | <i>Selasphorus rufus</i> | Rufous hummingbird | 10 |
| Trochilidae | <i>Stellula calliope</i> | Calliope hummingbird | 10 |
| Tyrannidae | <i>Tyrannus tyrannus</i> | Eastern kingbird | 10 |
| Canidae | <i>Vulpes vulpes</i> | Red fox | 10 |
| Cervidae | <i>Odocoileus virginianus</i> | White-tailed deer | 10 |

| | | | |
|------------------|--------------------------------|--------------------------------|----|
| Muridae | <i>Microtus montanus</i> | Montane vole | 10 |
| Muridae | <i>Microtus pennsylvanicus</i> | Meadow vole | 10 |
| Mustelidae | <i>Gulo gulo</i> | Wolverine | 10 |
| Mustelidae | <i>Mustela erminea</i> | Ermine | 10 |
| Mustelidae | <i>Spilogale gracilis</i> | Western spotted skunk | 10 |
| Sciuridae | <i>Spermophilus lateralis</i> | Golden-mantled ground squirrel | 10 |
| Soricidae | <i>Sorex vagrans</i> | Vagrant shrew | 10 |
| Vespertilionidae | <i>Euderma maculatum</i> | Spotted bat | 10 |
| Vespertilionidae | <i>Myotis ciliolabrum</i> | Western small-footed myotis | 10 |
| Colubridae | <i>Contia tenuis</i> | Sharptail snake | 10 |
| Colubridae | <i>Hypsiglena torquata</i> | Night snake | 10 |
| Colubridae | <i>Lampropeltis zonata</i> | California mountain kingsnake | 10 |
| Ambystomatidae | <i>Ambystoma macrodactylum</i> | Long-toed salamander | 11 |
| Ambystomatidae | <i>Ambystoma tigrinum</i> | Tiger salamander | 11 |
| Hylidae | <i>Pseudacris regilla</i> | Pacific chorus frog | 11 |
| Hylidae | <i>Pseudacris triseriata</i> | Western chorus frog | 11 |
| Apodidae | <i>Aeronautes saxatalis</i> | White-throated swift | 11 |
| Caprimulgidae | <i>Chordeiles minor</i> | Common nighthawk | 11 |
| Cathartidae | <i>Cathartes aura</i> | Turkey vulture | 11 |
| Columbidae | <i>Zenaidura macroura</i> | Mourning dove | 11 |
| Corvidae | <i>Pica pica</i> | Black-billed magpie | 11 |
| Emberizidae | <i>Icteria virens</i> | Yellow-breasted chat | 11 |
| Emberizidae | <i>Icterus galbula</i> | Northern oriole | 11 |
| Emberizidae | <i>Molothrus ater</i> | Brown-headed cowbird | 11 |
| Muscicapidae | <i>Myadestes townsendi</i> | Townsend's solitaire | 11 |
| Muscicapidae | <i>Sialia currucoides</i> | Mountain bluebird | 11 |
| Muscicapidae | <i>Sialia mexicana</i> | Western bluebird | 11 |
| Muscicapidae | <i>Turdus migratorius</i> | American robin | 11 |
| Picidae | <i>Colaptes auratus</i> | Northern flicker | 11 |
| Strigidae | <i>Asio otus</i> | Long-eared owl | 11 |
| Strigidae | <i>Bubo virginianus</i> | Great horned owl | 11 |
| Trochilidae | <i>Selasphorus platycercus</i> | Broad-tailed hummingbird | 11 |
| Troglodytidae | <i>Troglodytes aedon</i> | House wren | 11 |
| Canidae | <i>Canis latrans</i> | Coyote | 11 |
| Canidae | <i>Canis lupus</i> | Gray wolf | 11 |
| Cervidae | <i>Cervus elaphus nelsonii</i> | Rocky mountain elk | 11 |
| Cervidae | <i>Odocoileus hemionus</i> | Mule deer | 11 |
| Erethizontidae | <i>Erethizon dorsatum</i> | Common porcupine | 11 |
| Felidae | <i>Felis concolor</i> | Mountain lion | 11 |
| Felidae | <i>Lynx rufus</i> | Bobcat | 11 |
| Muridae | <i>Microtus longicaudus</i> | Long-tailed vole | 11 |
| Muridae | <i>Neotoma cinerea</i> | Bushy-tailed woodrat | 11 |

| | | | |
|----|--|-------------------------|--------------|
| 10 | Mountain vole | Microtus montanus | Microtus |
| 10 | Heath vole | Microtus pennsylvanicus | Microtus |
| 10 | Wolfers | Canis lupus | Canis |
| 10 | Timber | Mustela erminea | Mustelidae |
| 10 | Western spotted skunk | Spilogale gracilis | Mustelidae |
| 10 | Spontaneous lateral golden-mantled ground squirrel | Geomys lateralis | Citellidae |
| 10 | Spotted bat | Myotis myotis | Vesperugo |
| 10 | Western small-footed myotis | Myotis thomasi | Vesperugo |
| 10 | Whiskered bat | Myotis thomasi | Vesperugo |
| 10 | White bat | Myotis thomasi | Vesperugo |
| 10 | California mountain | Peromyscus truei | Peromyscus |
| 10 | Kingman | Peromyscus truei | Peromyscus |
| 11 | Long-footed salamander | Desmognathus | Desmognathus |
| 11 | Tiger salamander | Desmognathus | Desmognathus |
| 11 | White-throated frog | Rana sylvatica | Rana |
| 11 | Western chorus frog | Rana sylvatica | Rana |
| 11 | White-throated frog | Rana sylvatica | Rana |
| 11 | Common night hawk | Cathartes aura | Cathartes |
| 11 | Thrush | Cathartes aura | Cathartes |
| 11 | Mountain hawk | Cathartes aura | Cathartes |
| 11 | Black-billed magpie | Pipilo fuscus | Pipilo |
| 11 | Yellow-breasted chat | Geothlypis trichas | Geothlypis |
| 11 | Western oriole | Icterus parisorum | Icterus |
| 11 | Brown-headed cowbird | Molothrus ater | Molothrus |
| 11 | Townsend's solitaire | Salpinctes obsoletus | Salpinctes |
| 11 | Mountain bluebird | Stelioa montana | Stelioa |
| 11 | Western bluebird | Stelioa montana | Stelioa |
| 11 | American robin | Turdus migratorius | Turdus |
| 11 | Northern flicker | Colaptes auratus | Colaptes |
| 11 | Long-eared owl | Bubo virginianus | Bubo |
| 11 | Great horned owl | Bubo virginianus | Bubo |
| 11 | Scrub-tailed hummingbird | Amazilia | Amazilia |
| 11 | House wren | Troglodytes aedon | Troglodytes |
| 11 | Coyote | Canis latrans | Canis |
| 11 | Gray wolf | Canis lupus | Canis |
| 11 | Rocky mountain elk | Cervus elaphus | Cervus |
| 11 | White deer | Odocoileus hemionus | Odocoileus |
| 11 | Common porcupine | Erethizon dorsatum | Erethizon |
| 11 | Mountain lion | Felis concolor | Felis |
| 11 | Bobcat | Lynx rufus | Lynx |
| 11 | Long-tailed vole | Microtus longicauda | Microtus |
| 11 | Rocky-tailed woodrat | Neotoma rufipes | Neotoma |

| | | | |
|------------------|--------------------------------------|-------------------------------------|----|
| Muridae | <i>Peromyscus keenii</i> | Columbian mouse | 11 |
| Muridae | <i>Peromyscus maniculatus</i> | Deer mouse | 11 |
| Mustelidae | <i>Mustela frenata</i> | Long-tailed weasel | 11 |
| Mustelidae | <i>Taxidea taxus</i> | American badger | 11 |
| Soricidae | <i>Sorex cinereus</i> | Masked shrew | 11 |
| Ursidae | <i>Ursus americanus</i> | Black bear | 11 |
| Ursidae | <i>Ursus arctos</i> | Grizzly bear | 11 |
| Vespertilionidae | <i>Eptesicus fuscus</i> | Big brown bat | 11 |
| Vespertilionidae | <i>Lasionycteris noctivagans</i> | Silver-haired bat | 11 |
| Anguidae | <i>Elgaria coerulea</i> | Northern alligator lizard | 11 |
| Colubridae | <i>Coluber constrictor</i> | Racer | 11 |
| Colubridae | <i>Thamnophis elegans</i> | Western terrestrial garter snake | 11 |
| Colubridae | <i>Thamnophis sirtalis</i> | Common garter snake | 11 |
| Viperidae | <i>Crotalus viridis</i> | Western rattlesnake | 11 |

| | | | |
|----|------------------------|----------------------------|--------------|
| 11 | Peromyscus maniculatus | Mouse | Peromyscidae |
| 11 | Peromyscus maniculatus | Deer mouse | Peromyscidae |
| 11 | Onychomys leucogaster | Long-tailed weasel | Onychomyidae |
| 11 | Taxidea taxus | American badger | Taxidea |
| 11 | Urocyon cinereus | Masked shrew | Urocyonidae |
| 11 | Urocyon cinereus | Black bear | Urocyonidae |
| 11 | Urocyon cinereus | Grizzly bear | Urocyonidae |
| 11 | Urocyon cinereus | Big brown bat | Urocyonidae |
| 11 | Urocyon cinereus | Silver-haired bat | Urocyonidae |
| 11 | Urocyon cinereus | | Urocyonidae |
| 11 | Urocyon cinereus | Northern alligator lizard | Urocyonidae |
| 11 | Urocyon cinereus | Reptile | Urocyonidae |
| 11 | Urocyon cinereus | Western terrestrial garter | Urocyonidae |
| 11 | Urocyon cinereus | Snake | Urocyonidae |
| 11 | Urocyon cinereus | Common garter snake | Urocyonidae |
| 11 | Urocyon cinereus | Western rattlesnake | Urocyonidae |

The species in parentheses are the names of other structural species used by the author in his study.

Appendix VERTSHRB. Vertebrate species using open or closed, low-medium shrub structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project.

| Family | Scientific name | Common name | Versatility* |
|------------------|---|-------------------------------|--------------|
| Phasianidae | <i>Lagopus leucurus</i> | White-tailed ptarmigan | 0 |
| Leporidae | <i>Brachylagus idahoensis</i> | Pygmy rabbit | 0 |
| Emberizidae | <i>Dolichonyx oryzivorus</i> | Bobolink | 1 |
| Strigidae | <i>Athene cunicularia</i> | Burrowing owl | 1 |
| Falconidae | <i>Falco mexicanus</i> | Prairie falcon | 2 |
| Falconidae | <i>Falco rusticolus</i> | Gyr Falcon | 2 |
| Fringillidae | <i>Leucosticte tephrocotis</i> | Gray-crowned rosy finch | 2 |
| Motacillidae | <i>Anthus rubescens</i> | American pipit | 2 |
| Phasianidae | <i>Tympanuchus phasianellus columbianus</i> | Columbian sharp-tailed grouse | 2 |
| Strigidae | <i>Asio flammeus</i> | Short-eared owl | 2 |
| Strigidae | <i>Nyctea scandiaca</i> | Snowy owl | 2 |
| Heteromyidae | <i>Perognathus longimembris</i> | Little pocket mouse | 2 |
| Vespertilionidae | <i>Pipistrellus hesperus</i> | Western pipistrelle | 2 |
| Colubridae | <i>Sonora semiannulata</i> | Ground snake | 2 |
| Iguanidae | <i>Crotaphytus bicinctores</i> | Mojave black-collared lizard | 2 |
| Accipitridae | <i>Circus cyaneus</i> | Northern harrier | 3 |
| Emberizidae | <i>Amphispiza belli</i> | Sage sparrow | 3 |
| Emberizidae | <i>Passerculus sandwichensis</i> | Savannah sparrow | 3 |
| Hirundinidae | <i>Tachycineta bicolor</i> | Tree swallow | 3 |
| Paridae | <i>Parus rufescens</i> | Chestnut-backed chickadee | 3 |
| Picidae | <i>Dryocopus pileatus</i> | Pileated woodpecker | 3 |
| Bovidae | <i>Bos bison</i> | American bison | 3 |
| Canidae | <i>Urocyon cinereoargenteus</i> | Common gray fox | 3 |
| Canidae | <i>Vulpes velox</i> | Kit fox | 3 |
| Molossidae | <i>Tadarida brasiliensis</i> | Brazilian free-tailed bat | 3 |
| Ochotonidae | <i>Ochotona princeps</i> | American pika | 3 |
| Soricidae | <i>Sorex merriami</i> | Merriam's shrew | 3 |
| Talpidae | <i>Scapanus latimanus</i> | Broad-footed mole | 3 |
| Accipitridae | <i>Buteo swainsoni</i> | Swainson's hawk | 4 |
| Alcidae | <i>Brachyramphus marmoratus</i> | Marbled murrelet | 4 |
| Emberizidae | <i>Ammodramus savannarum</i> | Grasshopper sparrow | 4 |
| Emberizidae | <i>Amphispiza bilineata</i> | Black-throated sparrow | 4 |
| Falconidae | <i>Falco sparverius</i> | American kestrel | 4 |
| Phasianidae | <i>Bonasa umbellus</i> | Ruffed grouse | 4 |
| Strigidae | <i>Aegolius acadicus</i> | Northern saw-whet owl | 4 |
| Strigidae | <i>Strix varia</i> | Barred owl | 4 |
| Troglodytidae | <i>Troglodytes troglodytes</i> | Winter wren | 4 |
| Tyrannidae | <i>Empidonax wrightii</i> | Gray flycatcher | 4 |
| Muridae | <i>Lemmys curtatus</i> | Sagebrush vole | 4 |
| Muridae | <i>Peromyscus truei</i> | Pinyon mouse | 4 |
| Sciuridae | <i>Glaucomys sabrinus</i> | Northern flying squirrel | 4 |
| Sciuridae | <i>Marmota caligata</i> | Hoary marmot | 4 |
| Sciuridae | <i>Spermophilus brunneus</i> | Idaho ground squirrel | 4 |
| Iguanidae | <i>Sceloporus graciosus graciosus</i> | Sagebrush lizard | 4 |
| Apodidae | <i>Chaetura vauxi</i> | Vaux's swift | 5 |
| Emberizidae | <i>Poocetes gramineus</i> | Vesper sparrow | 5 |
| Emberizidae | <i>Sturnella neglecta</i> | Western meadowlark | 5 |
| Mimidae | <i>Oreoscoptes montanus</i> | Sage thrasher | 5 |
| Phasianidae | <i>Dendragapus obscurus</i> | Blue grouse | 5 |
| Phasianidae | <i>Meleagris gallopavo</i> | Wild turkey | 5 |
| Vireonidae | <i>Vireo olivaceus</i> | Red-eyed vireo | 5 |

| | | | |
|----------------|-------------------------------------|--------------------------------|---|
| Cervidae | <i>Rangifer tarandus caribou</i> | Woodland caribou | 5 |
| Geomyidae | <i>Thomomys bottae</i> | Botta's pocket gopher | 5 |
| Heteromyidae | <i>Dipodomys californicus</i> | California kangaroo rat | 5 |
| Sciuridae | <i>Spermophilus armatus</i> | Uinta ground squirrel | 5 |
| Iguanidae | <i>Gambelia wislizenii</i> | Longnose leopard lizard | 5 |
| Accipitridae | <i>Buteo lagopus</i> | Rough-legged hawk | 6 |
| Corvidae | <i>Corvus corax</i> | Common raven | 6 |
| Emberizidae | <i>Dendroica petechia</i> | Yellow warbler | 6 |
| Emberizidae | <i>Geothlypis trichas</i> | Common yellowthroat | 6 |
| Emberizidae | <i>Setophaga ruticilla</i> | American redstart | 6 |
| Emberizidae | <i>Spizella breweri</i> | Brewer's sparrow | 6 |
| Fringillidae | <i>Carduelis psaltria</i> | Lesser goldfinch | 6 |
| Hirundinidae | <i>Progne subis</i> | Purple martin | 6 |
| Laniidae | <i>Lanius excubitor</i> | Northern shrike | 6 |
| Mimidae | <i>Dumetella carolinensis</i> | Gray catbird | 6 |
| Mimidae | <i>Mimus polyglottos</i> | Northern mockingbird | 6 |
| Muscicapidae | <i>Catharus guttatus</i> | Hermit thrush | 6 |
| Muscicapidae | <i>Ixoreus naevius</i> | Varied thrush | 6 |
| Phasianidae | <i>Alectoris chukar</i> | Chukar | 6 |
| Phasianidae | <i>Callipepla californica</i> | California quail | 6 |
| Phasianidae | <i>Callipepla gambelii</i> | Gambel's quail | 6 |
| Phasianidae | <i>Perdix perdix</i> | Gray partridge | 6 |
| Picidae | <i>Melanerpes lewis</i> | Lewis' woodpecker | 6 |
| Picidae | <i>Picoides pubescens</i> | Downy woodpecker | 6 |
| Picidae | <i>Sphyrapicus nuchalis</i> | Red-naped sapsucker | 6 |
| Picidae | <i>Sphyrapicus thyroideus</i> | Williamson's sapsucker | 6 |
| Sittidae | <i>Sitta canadensis</i> | Red-breasted nuthatch | 6 |
| Troglodytidae | <i>Catherpes mexicanus</i> | Canyon wren | 6 |
| Troglodytidae | <i>Salpinctes obsoletus</i> | Rock wren | 6 |
| Antilocapridae | <i>Antilocapra americana</i> | Pronghorn | 6 |
| Bovidae | <i>Ovis canadensis californiana</i> | California bighorn sheep | 6 |
| Bovidae | <i>Ovis canadensis canadensis</i> | Rocky mountain bighorn sheep | 6 |
| Equidae | <i>Equus caballus</i> | Feral horse | 6 |
| Heteromyidae | <i>Dipodomys ordii</i> | Ord's kangaroo rat | 6 |
| Heteromyidae | <i>Perognathus parvus</i> | Great basin pocket mouse | 6 |
| Leporidae | <i>Sylvilagus floridanus</i> | Eastern cottontail | 6 |
| Leporidae | <i>Sylvilagus nuttallii</i> | Mountain cottontail | 6 |
| Muridae | <i>Neotoma lepida</i> | Desert woodrat | 6 |
| Muridae | <i>Onychomys leucogaster</i> | Northern grasshopper mouse | 6 |
| Muridae | <i>Peromyscus crinitus</i> | Canyon mouse | 6 |
| Muridae | <i>Phenacomys intermedius</i> | Heather vole | 6 |
| Sciuridae | <i>Ammospermophilus leucurus</i> | White-tailed antelope squirrel | 6 |
| Sciuridae | <i>Spermophilus beecheyi</i> | California ground squirrel | 6 |
| Sciuridae | <i>Spermophilus townsendii</i> | Townsend's ground squirrel | 6 |
| Sciuridae | <i>Spermophilus washingtoni</i> | Washington ground squirrel | 6 |
| Soricidae | <i>Sorex monticolus</i> | Montane shrew | 6 |
| Soricidae | <i>Sorex preblei</i> | Preble's shrew | 6 |
| Colubridae | <i>Masticophis taeniatus</i> | Striped whipsnake | 6 |
| Colubridae | <i>Rhinocheilus lecontei</i> | Longnose snake | 6 |
| Iguanidae | <i>Phrynosoma douglassii</i> | Short-horned lizard | 6 |
| Iguanidae | <i>Phrynosoma platyrhinos</i> | Desert horned lizard | 6 |
| Iguanidae | <i>Uta stansburiana</i> | Side-blotched lizard | 6 |
| Scincidae | <i>Eumeces skiltonianus</i> | Western skink | 6 |
| Telidae | <i>Cnemidophorus tigris</i> | Western whiptail | 6 |
| Telidae | <i>Cnemidophorus velox</i> | Plateau striped whiptail | 6 |
| Pelobatidae | <i>Spea intermontana</i> | Great basin spadefoot | 7 |
| Accipitridae | <i>Accipiter striatus</i> | Sharp-shinned hawk | 7 |
| Emberizidae | <i>Piranga ludoviciana</i> | Western tanager | 7 |

| | | | |
|------------------|--|-----------------------------|---|
| Emberizidae | <i>Vermivora peregrina</i> | Tennessee warbler | 7 |
| Emberizidae | <i>Vermivora ruficapilla</i> | Nashville warbler | 7 |
| Emberizidae | <i>Wilsonia pusilla</i> | Wilson's warbler | 7 |
| Falconidae | <i>Falco columbarius</i> | Merlin | 7 |
| Fringillidae | <i>Carpodacus cassinii</i> | Cassin's finch | 7 |
| Fringillidae | <i>Coccothraustes vespertinus</i> | Evening grosbeak | 7 |
| Fringillidae | <i>Pinicola enucleator</i> | Pine grosbeak | 7 |
| Hirundinidae | <i>Hirundo pyrrhonota</i> | Cliff swallow | 7 |
| Phasianidae | <i>Centrocercus urophasianus</i> | Sage grouse | 7 |
| Picidae | <i>Picoides villosus</i> | Hairy woodpecker | 7 |
| Sittidae | <i>Sitta carolinensis</i> | White-breasted nuthatch | 7 |
| Strigidae | <i>Surnia ulula</i> | Northern hawk owl | 7 |
| Tyrannidae | <i>Contopus borealis</i> | Olive-sided flycatcher | 7 |
| Tyrannidae | <i>Empidonax hammondi</i> | Hammond's flycatcher | 7 |
| Tyrannidae | <i>Sayornis saya</i> | Say's phoebe | 7 |
| Tyrannidae | <i>Tyrannus verticalis</i> | Western kingbird | 7 |
| Vireonidae | <i>Vireo gilvus</i> | Warbling vireo | 7 |
| Vireonidae | <i>Vireo solitarius</i> | Solitary vireo | 7 |
| Cervidae | <i>Alces alces</i> | Moose | 7 |
| Heteromyidae | <i>Dipodomys microps</i> | Chisel-toothed kangaroo rat | 7 |
| Heteromyidae | <i>Microdipodops megacephalus</i> | Dark kangaroo mouse | 7 |
| Leporidae | <i>Lepus townsendii</i> | White-tailed jackrabbit | 7 |
| Muridae | <i>Clethrionomys gapperi</i> | Southern red-backed vole | 7 |
| Muridae | <i>Microtus pennsylvanicus kincaidii</i> | Potholes meadow vole | 7 |
| Sciuridae | <i>Marmota flaviventris</i> | Yellow-bellied marmot | 7 |
| Sciuridae | <i>Spermophilus columbianus</i> | Columbian ground squirrel | 7 |
| Talpidae | <i>Scapanus orarius</i> | Coast mole | 7 |
| Vespertilionidae | <i>Lasiurus cinereus</i> | Hoary bat | 7 |
| Vespertilionidae | <i>Myotis volans</i> | Long-legged myotis | 7 |
| Accipitridae | <i>Accipiter cooperii</i> | Cooper's hawk | 8 |
| Accipitridae | <i>Accipiter gentilis</i> | Northern goshawk | 8 |
| Accipitridae | <i>Aquila chrysaetos</i> | Golden eagle | 8 |
| Bombycillidae | <i>Bombycilla cedrorum</i> | Cedar waxwing | 8 |
| Columbidae | <i>Columba livia</i> | Rock dove | 8 |
| Emberizidae | <i>Chondestes grammacus</i> | Lark sparrow | 8 |
| Emberizidae | <i>Dendroica coronata</i> | Yellow-rumped warbler | 8 |
| Emberizidae | <i>Pheucticus melanocephalus</i> | Black-headed grosbeak | 8 |
| Emberizidae | <i>Seiurus noveboracensis</i> | Northern waterthrush | 8 |
| Laniidae | <i>Lanius ludovicianus</i> | Loggerhead shrike | 8 |
| Muscicapidae | <i>Catharus fuscescens</i> | Veery | 8 |
| Muscicapidae | <i>Catharus ustulatus</i> | Swainson's thrush | 8 |
| Paridae | <i>Parus atricapillus</i> | Black-capped chickadee | 8 |
| Tyrannidae | <i>Empidonax oberholseri</i> | Dusky flycatcher | 8 |
| Tyrannidae | <i>Myiarchus cinerascens</i> | Ash-throated flycatcher | 8 |
| Tytonidae | <i>Tyto alba</i> | Common barn owl | 8 |
| Bovidae | <i>Oreamnos americanus</i> | Mountain goat | 8 |
| Geomyidae | <i>Thomomys mazama</i> | Western pocket gopher | 8 |
| Geomyidae | <i>Thomomys talpoides douglasi</i> | Brushprairie pocket gopher | 8 |
| Geomyidae | <i>Thomomys townsendii</i> | Townsend's pocket gopher | 8 |
| Mustelidae | <i>Mephitis mephitis</i> | Striped skunk | 8 |
| Sciuridae | <i>Spermophilus beldingi</i> | Belding's ground squirrel | 8 |
| Sciuridae | <i>Spermophilus elegans nevadensis</i> | Wyoming ground squirrel | 8 |
| Sciuridae | <i>Tamias minimus</i> | Least chipmunk | 8 |
| Vespertilionidae | <i>Antrozous pallidus</i> | Pallid bat | 8 |
| Iguanidae | <i>Sceloporus occidentalis</i> | Western fence lizard | 8 |
| Bufonidae | <i>Bufo woodhousii</i> | Woodhouse's toad | 9 |
| Accipitridae | <i>Buteo jamaicensis</i> | Red-tailed hawk | 9 |
| Emberizidae | <i>Oporornis tolmiei</i> | Macgillivray's warbler | 9 |

| | | | |
|------------------|-----------------------------------|--|----|
| Emberizidae | <i>Passerina amoena</i> | Lazuli bunting | 9 |
| Emberizidae | <i>Pheucticus ludovicianus</i> | Rose-breasted grosbeak | 9 |
| Emberizidae | <i>Spizella passerina</i> | Chipping sparrow | 9 |
| Fringillidae | <i>Carduelis tristis</i> | American goldfinch | 9 |
| Hirundinidae | <i>Hirundo rustica</i> | Barn swallow | 9 |
| Hirundinidae | <i>Tachycineta thalassina</i> | Violet-green swallow | 9 |
| Phasianidae | <i>Oreortyx pictus</i> | Mountain quail | 9 |
| Tyrannidae | <i>Contopus sordidulus</i> | Western wood-pewee | 9 |
| Tyrannidae | <i>Empidonax traillii</i> | Willow flycatcher | 9 |
| Didelphidae | <i>Didelphis virginiana</i> | Virginia opossum | 9 |
| Geomyidae | <i>Thomomys talpoides</i> | Northern pocket gopher | 9 |
| Geomyidae | <i>Thomomys talpoides limosus</i> | White salmon pocket gopher | 9 |
| Leporidae | <i>Lepus americanus</i> | Snowshoe hare | 9 |
| Muridae | <i>Reithrodontomys megalotis</i> | Western harvest mouse | 9 |
| Procyonidae | <i>Procyon lotor</i> | Common raccoon | 9 |
| Sciuridae | <i>Spermophilus saturatus</i> | Cascade golden-mantled ground squirrel | 9 |
| Vespertilionidae | <i>Myotis evotis</i> | Long-eared myotis | 9 |
| Vespertilionidae | <i>Myotis thysanodes</i> | Fringed myotis | 9 |
| Anguillidae | <i>Elgaria multicarinata</i> | Southern alligator lizard | 9 |
| Boidae | <i>Charina bottae</i> | Rubber boa | 9 |
| Colubridae | <i>Diadophis punctatus</i> | Ringneck snake | 9 |
| Colubridae | <i>Pituophis catenifer</i> | Gopher snake | 9 |
| Plethodontidae | <i>Ensatina eschscholtzii</i> | Ensatina | 10 |
| Accipitridae | <i>Buteo regalis</i> | Ferruginous hawk | 10 |
| Apodidae | <i>Cypseloides niger</i> | Black swift | 10 |
| Charadriidae | <i>Charadrius vociferus</i> | Killdeer | 10 |
| Corvidae | <i>Corvus brachyrhynchos</i> | American crow | 10 |
| Cuculidae | <i>Coccyzus americanus</i> | Yellow-billed cuckoo | 10 |
| Emberizidae | <i>Junco hyemalis</i> | Dark-eyed junco | 10 |
| Emberizidae | <i>Passerella iliaca</i> | Fox sparrow | 10 |
| Emberizidae | <i>Vermivora celata</i> | Orange-crowned warbler | 10 |
| Emberizidae | <i>Zonotrichia leucophrys</i> | White-crowned sparrow | 10 |
| Emberizidae | <i>Zonotrichia querula</i> | Harris' sparrow | 10 |
| Falconidae | <i>Falco peregrinus</i> | Peregrine falcon | 10 |
| Hirundinidae | <i>Stelgidopteryx serripennis</i> | Northern rough-winged swallow | 10 |
| Strigidae | <i>Otus kennicottii</i> | Western screech owl | 10 |
| Trochilidae | <i>Archilochus alexandri</i> | Black-chinned hummingbird | 10 |
| Trochilidae | <i>Selasphorus rufus</i> | Rufous hummingbird | 10 |
| Trochilidae | <i>Stellula calliope</i> | Calliope hummingbird | 10 |
| Tyrannidae | <i>Tyrannus tyrannus</i> | Eastern kingbird | 10 |
| Canidae | <i>Vulpes vulpes</i> | Red fox | 10 |
| Cervidae | <i>Odocoileus virginianus</i> | White-tailed deer | 10 |
| Muridae | <i>Microtus montanus</i> | Montane vole | 10 |
| Muridae | <i>Microtus pennsylvanicus</i> | Meadow vole | 10 |
| Mustelidae | <i>Gulo gulo</i> | Wolverine | 10 |
| Mustelidae | <i>Mustela erminea</i> | Ermine | 10 |
| Mustelidae | <i>Spilogale gracilis</i> | Western spotted skunk | 10 |
| Sciuridae | <i>Spermophilus lateralis</i> | Golden-mantled ground squirrel | 10 |
| Soricidae | <i>Sorex vagrans</i> | Vagrant shrew | 10 |
| Vespertilionidae | <i>Euderma maculatum</i> | Spotted bat | 10 |
| Vespertilionidae | <i>Myotis ciliolabrum</i> | Western small-footed myotis | 10 |
| Colubridae | <i>Contia tenuis</i> | Sharptail snake | 10 |
| Colubridae | <i>Hypsiglena torquata</i> | Night snake | 10 |
| Colubridae | <i>Lampropeltis zonata</i> | California mountain kingsnake | 10 |
| Amphystomatidae | <i>Amphystoma macrodactylum</i> | Long-toed salamander | 11 |
| Amphystomatidae | <i>Amphystoma tigrinum</i> | Tiger salamander | 11 |
| Hylidae | <i>Pseudacris regilla</i> | Pacific chorus frog | 11 |

| | | | |
|------------------|--------------------------------|----------------------------------|----|
| Hylidae | <i>Pseudacris triseriata</i> | Western chorus frog | 11 |
| Apodidae | <i>Aeronautes saxatalis</i> | White-throated swift | 11 |
| Caprimulgidae | <i>Chordeiles minor</i> | Common nighthawk | 11 |
| Cathartidae | <i>Cathartes aura</i> | Turkey vulture | 11 |
| Columbidae | <i>Zenaidura macroura</i> | Mourning dove | 11 |
| Corvidae | <i>Pica pica</i> | Black-billed magpie | 11 |
| Emberizidae | <i>Icteria virens</i> | Yellow-breasted chat | 11 |
| Emberizidae | <i>Icterus galbula</i> | Northern oriole | 11 |
| Emberizidae | <i>Molothrus ater</i> | Brown-headed cowbird | 11 |
| Muscicapidae | <i>Myadestes townsendi</i> | Townsend's solitaire | 11 |
| Muscicapidae | <i>Sialia currucoides</i> | Mountain bluebird | 11 |
| Muscicapidae | <i>Sialia mexicana</i> | Western bluebird | 11 |
| Muscicapidae | <i>Turdus migratorius</i> | American robin | 11 |
| Picidae | <i>Colaptes auratus</i> | Northern flicker | 11 |
| Strigidae | <i>Asio otus</i> | Long-eared owl | 11 |
| Strigidae | <i>Bubo virginianus</i> | Great horned owl | 11 |
| Trochilidae | <i>Selasphorus platycercus</i> | Broad-tailed hummingbird | 11 |
| Troglodytidae | <i>Troglodytes aedon</i> | House wren | 11 |
| Canidae | <i>Canis latrans</i> | Coyote | 11 |
| Canidae | <i>Canis lupus</i> | Gray wolf | 11 |
| Cervidae | <i>Cervus elaphus nelsonii</i> | Rocky mountain elk | 11 |
| Cervidae | <i>Odocoileus hemionus</i> | Mule deer | 11 |
| Erethizontidae | <i>Erethizon dorsatum</i> | Common porcupine | 11 |
| Felidae | <i>Felis concolor</i> | Mountain lion | 11 |
| Felidae | <i>Lynx rufus</i> | Bobcat | 11 |
| Muridae | <i>Microtus longicaudus</i> | Long-tailed vole | 11 |
| Muridae | <i>Neotoma cinerea</i> | Bushy-tailed woodrat | 11 |
| Muridae | <i>Peromyscus keenii</i> | Columbian mouse | 11 |
| Muridae | <i>Peromyscus maniculatus</i> | Deer mouse | 11 |
| Mustelidae | <i>Mustela frenata</i> | Long-tailed weasel | 11 |
| Mustelidae | <i>Taxidea taxus</i> | American badger | 11 |
| Soricidae | <i>Sorex cinereus</i> | Masked shrew | 11 |
| Ursidae | <i>Ursus americanus</i> | Black bear | 11 |
| Ursidae | <i>Ursus arctos</i> | Grizzly bear | 11 |
| Vespertilionidae | <i>Eptesicus fuscus</i> | Big brown bat | 11 |
| Vespertilionidae | <i>Lasiurus noctivagus</i> | Silver-haired bat | 11 |
| Anguillidae | <i>Elgaria coerulea</i> | Northern alligator lizard | 11 |
| Colubridae | <i>Coluber constrictor</i> | Racer | 11 |
| Colubridae | <i>Thamnophis elegans</i> | Western terrestrial garter snake | 11 |
| Colubridae | <i>Thamnophis sirtalis</i> | Common garter snake | 11 |
| Viperidae | <i>Crotalus viridis</i> | Western rattlesnake | 11 |

* - Versatility rating denotes the number of other structural stages used by the species (11 maximum).

| | | | |
|----|-------------------------|-------------------------|-------------------------|
| 11 | Western Gull | Western Gull | Western Gull |
| 12 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 13 | Common Noddy | Common Noddy | Common Noddy |
| 14 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 15 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 16 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 17 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 18 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 19 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 20 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 21 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 22 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 23 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 24 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 25 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 26 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 27 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 28 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 29 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 30 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 31 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 32 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 33 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 34 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 35 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 36 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 37 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 38 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 39 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 40 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 41 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 42 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 43 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 44 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 45 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 46 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 47 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 48 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |
| 49 | Black-billed Gull | Black-billed Gull | Black-billed Gull |
| 50 | Wedge-tailed Shearwater | Wedge-tailed Shearwater | Wedge-tailed Shearwater |

* - Vertically listing denotes the number of each structural stage used by the species in question.

Appendix VERTOLDF. Vertebrate species using single- and multi-storied old forest structural stages in the assessment area of the Interior Columbia Basin Ecosystem Management Project.

| Family | Scientific name | Common name | Versatility |
|----------------|-----------------------------------|---------------------------|-------------|
| Strigidae | <i>Otus flammeolus</i> | Flammulated owl | 0 |
| Certhiidae | <i>Certhia americana</i> | Brown creeper | 1 |
| Columbidae | <i>Columba fasciata</i> | Band-tailed pigeon | 1 |
| Fringillidae | <i>Loxia leucoptera</i> | White-winged crossbill | 1 |
| Strigidae | <i>Aegolius funereus</i> | Boreal owl | 1 |
| Sciuridae | <i>Sciurus griseus</i> | Western gray squirrel | 1 |
| Plethodontidae | <i>Batrachoseps wrighti</i> | Oregon slender salamander | 2 |
| Corvidae | <i>Nucifraga columbiana</i> | Clark's nutcracker | 2 |
| Emberizidae | <i>Dendroica townsendi</i> | Townsend's warbler | 2 |
| Fringillidae | <i>Loxia curvirostra</i> | Red crossbill | 2 |
| Muscicapidae | <i>Regulus satrapa</i> | Golden-crowned kinglet | 2 |
| Paridae | <i>Parus hudsonicus</i> | Boreal chickadee | 2 |
| Paridae | <i>Parus inornatus</i> | Plain titmouse | 2 |
| Phasianidae | <i>Dendragapus canadensis</i> | Spruce grouse | 2 |
| Picidae | <i>Melanerpes erythrocephalus</i> | Red-headed woodpecker | 2 |
| Picidae | <i>Picoides arcticus</i> | Black-backed woodpecker | 2 |
| Strigidae | <i>Glaucidium gnoma</i> | Northern pygmy-owl | 2 |
| Strigidae | <i>Strix nebulosa</i> | Great gray owl | 2 |
| Tyrannidae | <i>Empidonax occidentalis</i> | Cordilleran flycatcher | 2 |
| Muridae | <i>Clethrionomys californicus</i> | Western red-backed vole | 2 |
| Sciuridae | <i>Tamias dorsalis</i> | Cliff chipmunk | 2 |
| Sciuridae | <i>Tamiasciurus douglasii</i> | Douglas' squirrel | 2 |
| Sciuridae | <i>Tamiasciurus hudsonicus</i> | Red squirrel | 2 |
| Corvidae | <i>Gymnorhinus cyanocephalus</i> | Pinyon jay | 3 |
| Corvidae | <i>Perisoreus canadensis</i> | Gray jay | 3 |
| Muscicapidae | <i>Regulus calendula</i> | Ruby-crowned kinglet | 3 |
| Paridae | <i>Parus rufescens</i> | Chestnut-backed chickadee | 3 |
| Picidae | <i>Dryocopus pileatus</i> | Pileated woodpecker | 3 |
| Picidae | <i>Picoides albolarvatus</i> | White-headed woodpecker | 3 |
| Picidae | <i>Picoides tridactylus</i> | Three-toed woodpecker | 3 |
| Sittidae | <i>Sitta pygmaea</i> | Pygmy nuthatch | 3 |
| Muridae | <i>Microtus oregoni</i> | Creeping vole | 3 |
| Mustelidae | <i>Martes americana</i> | American marten | 3 |
| Mustelidae | <i>Martes pennanti</i> | Fisher | 3 |
| Sciuridae | <i>Tamias ruficaudus</i> | Red-tailed chipmunk | 3 |

Appendix 1: Vertebrate species using riparian and multi-riparian old
growth forests in the riparian zone of the Interior Columbia Basin
Riparian Management Project.

| Family | Scientific Name | Common Name | Veris- Sally |
|-------------------|------------------------------|---------------------------------|-----------------|
| Strigidae | <i>Bubo flammeus</i> | Flammulated owl | 0 |
| Cathartidae | <i>Cathartes aura</i> | Brown creeper | 1 |
| Columbidae | <i>Columba fasciata</i> | Red-tailed pigeon | 1 |
| Falconidae | <i>Loxia leucoptera</i> | White-winged crossbill | 1 |
| Strigidae | <i>Nyctaleus noctule</i> | Noctule owl | 1 |
| Strigidae | <i>Sceloglaux grisea</i> | Western gray screech owl | 1 |
| Pelecanidae | <i>Helicophaga nigripes</i> | Oregon slender salamander | 2 |
| Corvidae | <i>Modiola columbiana</i> | Clark's nutcracker | 2 |
| Empididae | <i>Gendroica townsendi</i> | Townsend's warbler | 2 |
| Falconidae | <i>Loxia curvirostris</i> | Red crossbill | 2 |
| Mniotiltidae | <i>Regulus satrapa</i> | Golden-crowned kinglet | 2 |
| Paridae | <i>Parus hudsonicus</i> | Forest chickadee | 2 |
| Paridae | <i>Parus inornatus</i> | Plain titmouse | 2 |
| Phalacrocoracidae | <i>Phalacrocorax auritus</i> | Spur-winged scull | 2 |
| Picidae | <i>Meleagris gallopavo</i> | Red-headed woodpecker | 2 |
| Picidae | <i>Geothlypis trichas</i> | Black-backed woodpecker | 2 |
| Strigidae | <i>Nyctaleus noctule</i> | Northern screech owl | 2 |
| Strigidae | <i>Sceloglaux grisea</i> | Great gray owl | 2 |
| Tyrannidae | <i>Condalia microphylla</i> | Condalia microphylla flycatcher | 2 |
| Strigidae | <i>Cathartes aura</i> | Western red-backed vole | 2 |
| Strigidae | <i>Tamias merriami</i> | Elf chipmunk | 2 |
| Strigidae | <i>Tamias merriami</i> | Douglas' squirrel | 2 |
| Strigidae | <i>Tamias merriami</i> | Red squirrel | 2 |
| Corvidae | <i>Cyanocitta stelleri</i> | Empidonax | 2 |
| Corvidae | <i>Corvus corax</i> | Gray jay | 2 |
| Mniotiltidae | <i>Regulus satrapa</i> | Ruby-crowned kinglet | 2 |
| Paridae | <i>Parus hudsonicus</i> | Chestnut-backed chickadee | 2 |
| Picidae | <i>Geothlypis trichas</i> | Black-headed woodpecker | 2 |
| Picidae | <i>Picoides stricklandi</i> | Red-headed woodpecker | 2 |
| Picidae | <i>Picoides stricklandi</i> | Three-toed woodpecker | 2 |
| Strigidae | <i>Nyctaleus noctule</i> | Pygmy night owl | 2 |
| Mniotiltidae | <i>Regulus satrapa</i> | Creeper vole | 2 |
| Mniotiltidae | <i>Regulus satrapa</i> | American martin | 2 |
| Mniotiltidae | <i>Regulus satrapa</i> | Flashed | 2 |
| Mniotiltidae | <i>Regulus satrapa</i> | Red-tailed chipmunk | 2 |

| | | | |
|------------------|--|-----------------------------|---|
| Soricidae | <i>Sorex trowbridgii</i> | Trowbridge's shrew | 3 |
| Plethodontidae | <i>Plethodon larselli</i> | Larch mountain salamander | 4 |
| Alcidae | <i>Brachyramphus marmoratus</i> | Marbled murrelet | 4 |
| Emberizidae | <i>Dendroica nigrescens</i> | Black-throated gray warbler | 4 |
| Phasianidae | <i>Bonasa umbellus</i> | Ruffed grouse | 4 |
| Strigidae | <i>Aegolius acadicus</i> | Northern saw-whet owl | 4 |
| Strigidae | <i>Strix varia</i> | Barred owl | 4 |
| Troglodytidae | <i>Troglodytes troglodytes</i> | Winter wren | 4 |
| Tyrannidae | <i>Empidonax wrightii</i> | Gray flycatcher | 4 |
| Aplodontidae | <i>Aplodontia rufa</i> | Mountain beaver | 4 |
| Cervidae | <i>Odocoileus hemionus columbianus</i> | Black-tailed deer | 4 |
| Felidae | <i>Lynx lynx</i> | Lynx | 4 |
| Muridae | <i>Lemmys curtatus</i> | Sagebrush vole | 4 |
| Muridae | <i>Peromyscus truei</i> | Pinyon mouse | 4 |
| Sciuridae | <i>Glaucomys sabrinus</i> | Northern flying squirrel | 4 |
| Sciuridae | <i>Marmota caligata</i> | Hoary marmot | 4 |
| Sciuridae | <i>Tamias umbrinus</i> | Uinta chipmunk | 4 |
| Soricidae | <i>Sorex hoyi</i> | Pygmy shrew | 4 |
| Talpidae | <i>Neurotrichus gibbsii</i> | Shrew-mole | 4 |
| Iguanidae | <i>Sceloporus graciosus graciosus</i> | Sagebrush lizard | 4 |
| Apodidae | <i>Chaetura vauxi</i> | Vaux's swift | 5 |
| Fringillidae | <i>Carduelis pinus</i> | Pine siskin | 5 |
| Paridae | <i>Parus gambeli</i> | Mountain chickadee | 5 |
| Phasianidae | <i>Dendragapus obscurus</i> | Blue grouse | 5 |
| Phasianidae | <i>Meleagris gallopavo</i> | Wild turkey | 5 |
| Trochilidae | <i>Calypte anna</i> | Anna's hummingbird | 5 |
| Vireonidae | <i>Vireo olivaceus</i> | Red-eyed vireo | 5 |
| Cervidae | <i>Rangifer tarandus caribou</i> | Woodland caribou | 5 |
| Heteromyidae | <i>Dipodomys californicus</i> | California kangaroo rat | 5 |
| Muridae | <i>Neotoma fuscipes</i> | Dusky-footed woodrat | 5 |
| Sciuridae | <i>Tamias amoenus</i> | Yellow-pine chipmunk | 5 |
| Vespertilionidae | <i>Myotis californicus</i> | California myotis | 5 |
| Vespertilionidae | <i>Myotis lucifugus</i> | Little brown myotis | 5 |
| Vespertilionidae | <i>Myotis yumanensis</i> | Yuma myotis | 5 |
| Iguanidae | <i>Gambelia wislizenii</i> | Longnose leopard lizard | 5 |
| Ambystomatidae | <i>Ambystoma gracile</i> | Northwestern salamander | 6 |
| Accipitridae | <i>Buteo lagopus</i> | Rough-legged hawk | 6 |
| Corvidae | <i>Corvus corax</i> | Common raven | 6 |
| Emberizidae | <i>Setophaga ruticilla</i> | American redstart | 6 |
| Emberizidae | <i>Spizella breweri</i> | Brewer's sparrow | 6 |
| Fringillidae | <i>Carduelis psaltria</i> | Lesser goldfinch | 6 |
| Laniidae | <i>Lanius excubitor</i> | Northern shrike | 6 |

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| Mimidae | <i>Dumetella carolinensis</i> | Gray catbird | 6 |
| Muscicapidae | <i>Catharus guttatus</i> | Hermit thrush | 6 |
| Muscicapidae | <i>Ixoreus naevius</i> | Varied thrush | 6 |
| Phasianidae | <i>Alectoris chukar</i> | Chukar | 6 |
| Phasianidae | <i>Callipepla californica</i> | California quail | 6 |
| Phasianidae | <i>Callipepla gambelii</i> | Gambel's quail | 6 |
| Phasianidae | <i>Perdix perdix</i> | Gray partridge | 6 |
| Picidae | <i>Melanerpes lewis</i> | Lewis' woodpecker | 6 |
| Picidae | <i>Picoides pubescens</i> | Downy woodpecker | 6 |
| Picidae | <i>Sphyrapicus nuchalis</i> | Red-naped sapsucker | 6 |
| Picidae | <i>Sphyrapicus thyroideus</i> | Williamson's sapsucker | 6 |
| Sittidae | <i>Sitta canadensis</i> | Red-breasted nuthatch | 6 |
| Troglodytidae | <i>Catherpes mexicanus</i> | Canyon wren | 6 |
| Troglodytidae | <i>Salpinctes obsoletus</i> | Rock wren | 6 |
| Antilocapridae | <i>Antilocapra americana</i> | Pronghorn | 6 |
| Bovidae | <i>Ovis canadensis californiana</i> | California bighorn sheep | 6 |
| Bovidae | <i>Ovis canadensis canadensis</i> | Rocky mountain bighorn sheep | 6 |
| Equidae | <i>Equus caballus</i> | Feral horse | 6 |
| Heteromyidae | <i>Dipodomys ordii</i> | Ord's kangaroo rat | 6 |
| Heteromyidae | <i>Perognathus parvus</i> | Great basin pocket mouse | 6 |
| Leporidae | <i>Sylvilagus floridanus</i> | Eastern cottontail | 6 |
| Leporidae | <i>Sylvilagus nuttallii</i> | Mountain cottontail | 6 |
| Muridae | <i>Neotoma lepida</i> | Desert woodrat | 6 |
| Muridae | <i>Onychomys leucogaster</i> | Northern grasshopper mouse | 6 |
| Muridae | <i>Peromyscus crinitus</i> | Canyon mouse | 6 |
| Muridae | <i>Phenacomys intermedius</i> | Heather vole | 6 |
| Sciuridae | <i>Ammospermophilus leucurus</i> | White-tailed antelope squirrel | 6 |
| Sciuridae | <i>Spermophilus beecheyi</i> | California ground squirrel | 6 |
| Sciuridae | <i>Spermophilus townsendii</i> | Townsend's ground squirrel | 6 |
| Sciuridae | <i>Spermophilus washingtoni</i> | Washington ground squirrel | 6 |
| Soricidae | <i>Sorex monticolus</i> | Montane shrew | 6 |
| Soricidae | <i>Sorex preblei</i> | Preble's shrew | 6 |
| Colubridae | <i>Masticophis taeniatus</i> | Striped whipsnake | 6 |
| Colubridae | <i>Rhinocheilus lecontei</i> | Longnose snake | 6 |

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| Iguanidae | <i>Phrynosoma douglassii</i> | Short-horned lizard | 6 |
| Iguanidae | <i>Phrynosoma platyrhinos</i> | Desert horned lizard | 6 |
| Iguanidae | <i>Uta stansburiana</i> | Side-blotched lizard | 6 |
| Scincidae | <i>Eumeces skiltonianus</i> | Western skink | 6 |
| Teiidae | <i>Cnemidophorus tigris</i> | Western whiptail | 6 |
| Teiidae | <i>Cnemidophorus velox</i> | Plateau striped whiptail | 6 |
| Pelobatidae | <i>Spea intermontana</i> | Great basin spadefoot | 7 |
| Emberizidae | <i>Piranga ludoviciana</i> | Western tanager | 7 |
| Emberizidae | <i>Vermivora peregrina</i> | Tennessee warbler | 7 |
| Fringillidae | <i>Carpodacus cassinii</i> | Cassin's finch | 7 |
| Fringillidae | <i>Coccothraustes vespertinus</i> | Evening grosbeak | 7 |
| Fringillidae | <i>Pinicola enucleator</i> | Pine grosbeak | 7 |
| Hirundinidae | <i>Hirundo pyrrhonota</i> | Cliff swallow | 7 |
| Phasianidae | <i>Centrocercus urophasianus</i> | Sage grouse | 7 |
| Picidae | <i>Picoides villosus</i> | Hairy woodpecker | 7 |
| Sittidae | <i>Sitta carolinensis</i> | White-breasted nuthatch | 7 |
| Strigidae | <i>Surnia ulula</i> | Northern hawk owl | 7 |
| Tyrannidae | <i>Contopus borealis</i> | Olive-sided flycatcher | 7 |
| Tyrannidae | <i>Empidonax hammondi</i> | Hammond's flycatcher | 7 |
| Tyrannidae | <i>Sayornis saya</i> | Say's phoebe | 7 |
| Tyrannidae | <i>Tyrannus verticalis</i> | Western kingbird | 7 |
| Vireonidae | <i>Vireo gilvus</i> | Warbling vireo | 7 |
| Vireonidae | <i>Vireo solitarius</i> | Solitary vireo | 7 |
| Cervidae | <i>Alces alces</i> | Moose | 7 |
| Heteromyidae | <i>Dipodomys microps</i> | Chisel-toothed kangaroo rat | 7 |
| Heteromyidae | <i>Microdipodops megacephalus</i> | Dark kangaroo mouse | 7 |
| Leporidae | <i>Lepus townsendii</i> | White-tailed jackrabbit | 7 |
| Muridae | <i>Clethrionomys gapperi</i> | Southern red-backed vole | 7 |
| Muridae | <i>Microtus pennsylvanicus kincaidi</i> | Potholes meadow vole | 7 |
| Sciuridae | <i>Marmota flaviventris</i> | Yellow-bellied marmot | 7 |
| Sciuridae | <i>Spermophilus columbianus</i> | Columbian ground squirrel | 7 |
| Talpidae | <i>Scapanus orarius</i> | Coast mole | 7 |
| Vespertilionidae | <i>Lasiurus cinereus</i> | Hoary bat | 7 |
| Vespertilionidae | <i>Myotis volans</i> | Long-legged myotis | 7 |
| Accipitridae | <i>Accipiter cooperii</i> | Cooper's hawk | 8 |
| Accipitridae | <i>Accipiter gentilis</i> | Northern goshawk | 8 |
| Accipitridae | <i>Aquila chrysaetos</i> | Golden eagle | 8 |
| Columbidae | <i>Columba livia</i> | Rock dove | 8 |
| Emberizidae | <i>Chondestes grammacus</i> | Lark sparrow | 8 |

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| Emberizidae | <i>Dendroica coronata</i> | Yellow-rumped warbler | 8 |
| Emberizidae | <i>Seiurus noveboracensis</i> | Northern waterthrush | 8 |
| Laniidae | <i>Lanius ludovicianus</i> | Loggerhead shrike | 8 |
| Muscicapidae | <i>Catharus ustulatus</i> | Swainson's thrush | 8 |
| Paridae | <i>Parus atricapillus</i> | Black-capped chickadee | 8 |
| Tyrannidae | <i>Empidonax oberholseri</i> | Dusky flycatcher | 8 |
| Tyrannidae | <i>Myiarchus cinerascens</i> | Ash-throated flycatcher | 8 |
| Bovidae | <i>Oreamnos americanus</i> | Mountain goat | 8 |
| Geomyidae | <i>Thomomys mazama</i> | Western pocket gopher | 8 |
| Geomyidae | <i>Thomomys talpoides douglasi</i> | Brushprairie pocket gopher | 8 |
| Geomyidae | <i>Thomomys townsendii</i> | Townsend's pocket gopher | 8 |
| Mustelidae | <i>Mephitis mephitis</i> | Striped skunk | 8 |
| Sciuridae | <i>Spermophilus beldingi</i> | Belding's ground squirrel | 8 |
| Sciuridae | <i>Spermophilus elegans nevadensis</i> | Wyoming ground squirrel | 8 |
| Sciuridae | <i>Tamias minimus</i> | Least chipmunk | 8 |
| Vespertilionidae | <i>Antrozous pallidus</i> | Pallid bat | 8 |
| Iguanidae | <i>Sceloporus occidentalis</i> | Western fence lizard | 8 |
| Bufonidae | <i>Bufo woodhousii</i> | Woodhouse's toad | 9 |
| Accipitridae | <i>Buteo jamaicensis</i> | Red-tailed hawk | 9 |
| Emberizidae | <i>Oporornis tolmiei</i> | Macgillivray's warbler | 9 |
| Emberizidae | <i>Passerina amoena</i> | Lazuli bunting | 9 |
| Emberizidae | <i>Pheucticus ludovicianus</i> | Rose-breasted grosbeak | 9 |
| Emberizidae | <i>Spizella passerina</i> | Chipping sparrow | 9 |
| Hirundinidae | <i>Hirundo rustica</i> | Barn swallow | 9 |
| Hirundinidae | <i>Tachycineta thalassina</i> | Violet-green swallow | 9 |
| Phasinaidae | <i>Oreortyx pictus</i> | Mountain quail | 9 |
| Tyrannidae | <i>Contopus sordidulus</i> | Western wood-pewee | 9 |
| Tyrannidae | <i>Empidonax traillii</i> | Willow flycatcher | 9 |
| Didelphidae | <i>Didelphis virginiana</i> | Virginia opossum | 9 |
| Geomyidae | <i>Thomomys talpoides</i> | Northern pocket gopher | 9 |
| Geomyidae | <i>Thomomys talpoides limosus</i> | White salmon pocket gopher | 9 |
| Leporidae | <i>Lepus americanus</i> | Snowshoe hare | 9 |
| Muridae | <i>Reithrodontomys megalotis</i> | Western harvest mouse | 9 |
| Procyonidae | <i>Procyon lotor</i> | Common raccoon | 9 |
| Sciuridae | <i>Spermophilus saturatus</i> | Cascade golden-mantled ground squirrel | 9 |
| Vespertilionidae | <i>Myotis evotis</i> | Long-eared myotis | 9 |
| Vespertilionidae | <i>Myotis thysanodes</i> | Fringed myotis | 9 |

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|----|--------------------------|------------------------|----------------|
| 1 | Yellow-bellied sapsucker | Caprimulgus vociferans | Caprimulgidae |
| 2 | Red-breasted nuthatch | Sitta carolinensis | Sittidae |
| 3 | Indigo-bird | Indigofera tinctoria | Indigoferaceae |
| 4 | Red-bellied nuthatch | Sitta carolinensis | Sittidae |
| 5 | Black-bellied nuthatch | Sitta carolinensis | Sittidae |
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| Anguidae | <i>Elgaria</i> <i>multicarinata</i> | Southern alligator lizard | 9 |
| Boidae | <i>Charina bottae</i> | Rubber boa | 9 |
| Colubridae | <i>Diadophis punctatus</i> | Ringneck snake | 9 |
| Colubridae | <i>Pituophis catenifer</i> | Gopher snake | 9 |
| Plethodontidae | <i>Ensatina</i> <i>eschschooltzii</i> | Ensatina | 10 |
| Accipitridae | <i>Buteo regalis</i> | Ferruginous hawk | 10 |
| Apodidae | <i>Cypseloides niger</i> | Black swift | 10 |
| Charadriidae | <i>Charadrius vociferus</i> | Killdeer | 10 |
| Corvidae | <i>Corvus</i> <i>brachyrhynchos</i> | American crow | 10 |
| Cuculidae | <i>Coccyzus americanus</i> | Yellow-billed cuckoo | 10 |
| Emberizidae | <i>Junco hyemalis</i> | Dark-eyed junco | 10 |
| Emberizidae | <i>Passerella iliaca</i> | Fox sparrow | 10 |
| Emberizidae | <i>Vermivora celata</i> | Orange-crowned warbler | 10 |
| Emberizidae | <i>Zonotrichia</i> <i>leucophrys</i> | White-crowned sparrow | 10 |
| Emberizidae | <i>Zonotrichia querula</i> | Harris' sparrow | 10 |
| Falconidae | <i>Falco peregrinus</i> | Peregrine falcon | 10 |
| Hirundinidae | <i>Stelgidopteryx</i> <i>serripennis</i> | Northern rough-winged swallow | 10 |
| Strigidae | <i>Otus kennicottii</i> | Western screech owl | 10 |
| Trochilidae | <i>Archilochus</i> <i>alexandri</i> | Black-chinned hummingbird | 10 |
| Trochilidae | <i>Selasphorus rufus</i> | Rufous hummingbird | 10 |
| Trochilidae | <i>Stellula calliope</i> | Calliope hummingbird | 10 |
| Tyrannidae | <i>Tyrannus tyrannus</i> | Eastern kingbird | 10 |
| Canidae | <i>Vulpes vulpes</i> | Red fox | 10 |
| Cervidae | <i>Odocoileus</i> <i>virginianus</i> | White-tailed deer | 10 |
| Muridae | <i>Microtus montanus</i> | Montane vole | 10 |
| Muridae | <i>Microtus</i> <i>pennsylvanicus</i> | Meadow vole | 10 |
| Mustelidae | <i>Gulo gulo</i> | Wolverine | 10 |
| Mustelidae | <i>Mustela erminea</i> | Ermine | 10 |
| Mustelidae | <i>Spilogale gracilis</i> | Western spotted skunk | 10 |
| Sciuridae | <i>Spermophilus</i> <i>lateralis</i> | Golden-mantled ground squirrel | 10 |
| Soricidae | <i>Sorex vagrans</i> | Vagrant shrew | 10 |
| Vespertilionidae | <i>Euderma maculatum</i> | Spotted bat | 10 |
| Vespertilionidae | <i>Myotis ciliolabrum</i> | Western small-footed myotis | 10 |
| Colubridae | <i>Contia tenuis</i> | Sharptail snake | 10 |
| Colubridae | <i>Hypsiglena torquata</i> | Night snake | 10 |
| Colubridae | <i>Lampropeltis zonata</i> | California mountain kingsnake | 10 |
| Ambystomatidae | <i>Ambystoma</i> <i>macrodactylum</i> | Long-toed salamander | 11 |
| Ambystomatidae | <i>Ambystoma tigrinum</i> | Tiger salamander | 11 |
| Hylidae | <i>Pseudacris regilla</i> | Pacific chorus frog | 11 |

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| 1 | Western Kingbird | Regulus |
| 2 | Eastern Kingbird | Regulus |
| 3 | Robin | Erithacus |
| 4 | Chipping Sparrow | Spizella |
| 5 | Junco | Junco |
| 6 | Starling | Stercorarius |
| 7 | House Sparrow | Passer |
| 8 | Tree Sparrow | Passer |
| 9 | Field Sparrow | Passer |
| 10 | Rock Sparrow | Passer |
| 11 | White-throated Sparrow | Spizella |
| 12 | White-crowned Sparrow | Spizella |
| 13 | White-bellied Sparrow | Spizella |
| 14 | White-eyed Sparrow | Spizella |
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| 71 | White-bellied Sparrow | Spizella |
| 72 | White-bellied Sparrow | Spizella |
| 73 | White-bellied Sparrow | Spizella |
| 74 | White-bellied Sparrow | Spizella |
| 75 | White-bellied Sparrow | Spizella |
| 76 | White-bellied Sparrow | Spizella |
| 77 | White-bellied Sparrow | Spizella |
| 78 | White-bellied Sparrow | Spizella |
| 79 | White-bellied Sparrow | Spizella |
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| 81 | White-bellied Sparrow | Spizella |
| 82 | White-bellied Sparrow | Spizella |
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| 85 | White-bellied Sparrow | Spizella |
| 86 | White-bellied Sparrow | Spizella |
| 87 | White-bellied Sparrow | Spizella |
| 88 | White-bellied Sparrow | Spizella |
| 89 | White-bellied Sparrow | Spizella |
| 90 | White-bellied Sparrow | Spizella |
| 91 | White-bellied Sparrow | Spizella |
| 92 | White-bellied Sparrow | Spizella |
| 93 | White-bellied Sparrow | Spizella |
| 94 | White-bellied Sparrow | Spizella |
| 95 | White-bellied Sparrow | Spizella |
| 96 | White-bellied Sparrow | Spizella |
| 97 | White-bellied Sparrow | Spizella |
| 98 | White-bellied Sparrow | Spizella |
| 99 | White-bellied Sparrow | Spizella |
| 100 | White-bellied Sparrow | Spizella |

| | | | |
|------------------|----------------------------------|----------------------------------|----|
| Hylidae | <i>Pseudacris triseriata</i> | Western chorus frog | 11 |
| Apodidae | <i>Aeronautes saxatalis</i> | White-throated swift | 11 |
| Caprimulgidae | <i>Chordeiles minor</i> | Common nighthawk | 11 |
| Cathartidae | <i>Cathartes aura</i> | Turkey vulture | 11 |
| Columbidae | <i>Zenaida macroura</i> | Mourning dove | 11 |
| Corvidae | <i>Pica pica</i> | Black-billed magpie | 11 |
| Emberizidae | <i>Icteria virens</i> | Yellow-breasted chat | 11 |
| Emberizidae | <i>Icterus galbula</i> | Northern oriole | 11 |
| Emberizidae | <i>Molothrus ater</i> | Brown-headed cowbird | 11 |
| Muscicapidae | <i>Myadestes townsendi</i> | Townsend's solitaire | 11 |
| Muscicapidae | <i>Sialia currucoides</i> | Mountain bluebird | 11 |
| Muscicapidae | <i>Sialia mexicana</i> | Western bluebird | 11 |
| Muscicapidae | <i>Turdus migratorius</i> | American robin | 11 |
| Picidae | <i>Colaptes auratus</i> | Northern flicker | 11 |
| Strigidae | <i>Asio otus</i> | Long-eared owl | 11 |
| Strigidae | <i>Bubo virginianus</i> | Great horned owl | 11 |
| Trochilidae | <i>Selasphorus platycercus</i> | Broad-tailed hummingbird | 11 |
| Troglodytidae | <i>Troglodytes aedon</i> | House wren | 11 |
| Canidae | <i>Canis latrans</i> | Coyote | 11 |
| Canidae | <i>Canis lupus</i> | Gray wolf | 11 |
| Cervidae | <i>Cervus elaphus nelsonii</i> | Rocky mountain elk | 11 |
| Cervidae | <i>Odocoileus hemionus</i> | Mule deer | 11 |
| Erethizontidae | <i>Erethizon dorsatum</i> | Common porcupine | 11 |
| Felidae | <i>Felis concolor</i> | Mountain lion | 11 |
| Felidae | <i>Lynx rufus</i> | Bobcat | 11 |
| Muridae | <i>Microtus longicaudus</i> | Long-tailed vole | 11 |
| Muridae | <i>Neotoma cinerea</i> | Bushy-tailed woodrat | 11 |
| Muridae | <i>Peromyscus keenii</i> | Columbian mouse | 11 |
| Muridae | <i>Peromyscus maniculatus</i> | Deer mouse | 11 |
| Mustelidae | <i>Mustela frenata</i> | Long-tailed weasel | 11 |
| Mustelidae | <i>Taxidea taxus</i> | American badger | 11 |
| Soricidae | <i>Sorex cinereus</i> | Masked shrew | 11 |
| Ursidae | <i>Ursus americanus</i> | Black bear | 11 |
| Ursidae | <i>Ursus arctos</i> | Grizzly bear | 11 |
| Vespertilionidae | <i>Eptesicus fuscus</i> | Big brown bat | 11 |
| Vespertilionidae | <i>Lasionycteris noctivagans</i> | Silver-haired bat | 11 |
| Anguidae | <i>Elgaria coerulea</i> | Northern alligator lizard | 11 |
| Colubridae | <i>Coluber constrictor</i> | Racer | 11 |
| Colubridae | <i>Thamnophis elegans</i> | Western terrestrial garter snake | 11 |
| Colubridae | <i>Thamnophis sirtalis</i> | Common garter snake | 11 |
| Viperidae | <i>Crotalus viridis</i> | Western rattlesnake | 11 |

Veracity of the species is not in doubt. The number of other specimens is not known.

Table NATHAS. List of possible natural areas within Columbia River Basin.

| Designation | Objectives of allocation | Administrative level of allocation | Standardization across ownership | Range in size |
|--|--|---|---|----------------------|
| AREAS OF CRITICAL ENVIRONMENTAL CONCERN | Protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes. | BLM administrative designation | Potential ACEC's considered in BLM planning process; intent and management varies significantly | Small to large. |
| BIOSPHERE RESERVES | To conserve for present and future use the diversity and integrity of biotic communities of plants and animals within natural ecosystems, and to safeguard the genetic diversity of species on which their continuing evolution depends. | UNESCO, United Nations designates areas, but management is up to landowner or agency. | Management varies depending on ownership. | Generally very large |
| CONGRESSIONALLY DESIGNATED "SPECIAL" AREAS | Varies with specific legislation as identified below. | Act of Congress. | None. | Various. |
| <u>CDA's in R-1</u> | Rattlesnake NRA: Promote watershed, recreational, wildlife, and educational values. | | | |
| <u>CDA's in R-4</u> | Sawtooth NRA: 1. Preserve and protect the natural, scenic, historic, pastoral, and fish and wildlife values. 2. Enhance recreation values including the preservation of sites associated with and typifying the economic and social history of the A West. 3. Protect and conserve the salmon and other fisheries. | | | |

Table NATHAS. List of possible natural areas within Columbia River Basin.

| Designation | Objectives of allocation | Administrative level of allocation | Standardization across ownership | Range in size |
|------------------------------|--|--|---|-------------------|
| <u>CDA's in R-6</u> | PART OF CRGNSA WITHIN ASSESSMENT AREA BOUNDARY | | | |
| | Columbia River Gorge NSA: 1. Protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge. 2. Protect and support the economy of the Columbia River Gorge area by encouraging growth to existing urban areas and allowing future economic development in a manner that is consistent with (1). | | | |
| | Hells Canyon Natural Recreation Area: 1. Preserve the natural beauty and historical and archaeological values. 2. Enhance recreational and ecological values and public enjoyment of the area. | | | |
| | Newberry NVM: 1. Preserve and protect its remarkable geologic landforms. 2. Provide for conservation, protection, interpretation, and enhancement of its ecological, botanical, scientific, scenic, recreational, cultural, and fish and wildlife resources. | | | |
| NATIONAL NATURAL LANDMARKS | SMALL PART OF OCRA IN ASSESSMENT AREA BOUNDARY | | | |
| | Oregon Cascades Recreation Area: 1. Protect, conserve, and manage area in an undeveloped condition. 2. Provide a range of recreation opportunities from primitive to full service developed campgrounds. 3. Provide access for use by the public. 4. To the extent practicable, maintain the natural and scenic character of the area. | | | |
| NATIONAL NATURAL LANDMARKS | Identify and encourage the preservation of the full range of geological and ecological features that are determined to represent nationally significant examples of the Nation's natural heritage. | Designation is not a land withdrawal, does not change the ownership of a site, and does not dictate activity. Federal agencies should consider the unique properties of these nationally significant areas in completing NEPA. | Depends on ownership. Areas can be on private as well as public lands. Management varies. | 12 - 170,000 ac |
| NATIONAL PARKS AND MONUMENTS | Purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. | Act of Congress. | Each area within the system is administered in accordance with the provisions of any statute made specifically applicable to that area. Park and Monument managers provide specific purposes and management direction by reading enabling legislation or proclamation and determine general management direction, not inconsistent with the enabling legislation, from the organic act. | 98 - 2,219,790 ac |

Table NATHAS. List of possible natural areas within Columbia River Basin.

| Designation | Objectives of allocation | Administrative level of allocation | Standardization across ownership | Range in size |
|-----------------------------------|---|--|---|------------------------------------|
| NATIONAL WILDLIFE REFUGE | To provide, preserve, restore, and manage a network of lands and waters sufficient in size, diversity, and location to meet society's needs for areas where the widest possible spectrum of benefits associated with wildlife and wildlands is enhanced and made available. | Designated by Department of Interior, U.S. Fish and Wildlife Service. | Management varies depending on individual areas and wildlife needs. | 1,837-536,955 |
| OUTSTANDING NATURAL AREAS | Preserve areas of unusual natural characteristics. | BLM administrative designation. | | Small to large. |
| RESEARCH NATURAL AREA | 1. Preserve examples of all significant terrestrial and aquatic ecosystems. 2. Research and education areas. 3. Preserve gene pools for TES species. 4. Serve as benchmarks against which the influences of human management activity can be compared. | USFS Regional Forester and Station Director BLM State Director. FWS Regional Director. NPS Regional Director. | All Federal agencies generally use similar criteria for establishment, though management direction not always the same. | 40-33,350 acres. |
| ROADLESS AREAS (WILDERNESS STUDY) | Inventory for potential wilderness based on size (5,000 acres or self-contained ecosystem) with additional criteria for naturalness. | Regional Forester - completed through existing Forest Plans. BLM State Director - areas currently being evaluated in Resource Management Plans. NPS - not currently evaluating roadless areas. | Inventory directed by Wilderness Act, and subsequent Wilderness legislation. Agencies apply somewhat similar criteria for inventory and subsequent study. | Sized as described for Wilderness. |

IN SENATE

January 1, 1910

REPORT OF THE

COMMISSIONER OF

THE LAND OFFICE

IN RESPONSE TO A RESOLUTION

PASSED BY THE SENATE

APRIL 1, 1909

THE COMMISSIONER OF THE LAND OFFICE

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ALBANY

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Table NATHAS. List of possible natural areas within Columbia River Basin.

| Designation | Objectives of allocation | Administrative level of allocation | Standardization across ownership | Range in size |
|---|--|---|--|---|
| SPECIAL INTEREST AREAS | 1. Protect and, where appropriate, foster public use and enjoyment of areas with scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. 2. Classify areas that possess unusual recreation and scientific values for public study, use, or enjoyment. | Forest Service administrative designation under authority in 36 CFR 294.1 and 294.1(b). Approval varies by authority and size. | Potential SIA's considered in Forest Service planning process; intent and management varies significantly. | Small to very large. |
| WILD AND SCENIC RIVERS | 1. Preserve free-flowing condition and protect water quality. 2. Protect and enhance the outstandingly remarkable values. 3. Scientific value for study of free-flow processes. 4. Gene reservoirs and refugia for river-dependent species. 5. Some systems provide benchmarks where human management can be compared. | 1. Act of Congress; or, 2. for state protected river, by petition of Governor to Secretary of Interior (becomes part of Federal W&SR's System to be administered by State). | Federal statute establishes framework, though agency interpretation and resultant management varies. | No length required. Oft a portion of river system designated. Corridor will be flexible but limited to 1/4 mile per river mile. |
| WILD AND SCENIC CONGRESSIONALLY-AUTHORIZED STUDY RIVERS | Inventory for potential W&SR's based on eligibility (free-flow, one or more outstandingly remarkable value). Protected, by statute from water resources projects and, for "wild" rivers, mining/mineral leasing. Agency direction is to protect and, as practicable, enhance outstanding values. Inventoried or recommended classification to be maintained. | Act of Congress. | Agencies apply somewhat similar criteria for eligibility and subsequent study. | As for designated rivers corridor 1/4 mile from ordinary high water mark. |

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IN SENATE
January 15, 1913

REPORT OF THE
COMMISSIONERS OF THE
LAND OFFICE

ALBANY: J.B. LEECH, STATE PRINTER, 1913.

RECEIVED JANUARY 15 1913

STATE OF NEW YORK

IN SENATE

JANUARY 15, 1913

REPORT OF THE

COMMISSIONERS OF THE

LAND OFFICE

ALBANY: J.B. LEECH, STATE PRINTER, 1913.

RECEIVED JANUARY 15 1913

STATE OF NEW YORK

IN SENATE

JANUARY 15, 1913

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| Designation | Objectives of allocation | Administrative level of allocation | Standardization across ownership | Range in size |
|---|--|--|--|---|
| WILD AND SCENIC STUDY RIVERS (IDENTIFIED VIA AGENCY PLANNING PROCESSES) | Inventory for potential W&SR's based on eligibility (free-flow, one or more outstandingly remarkable value). Agency direction to protect free-flow within authorities and protect and, as practicable enhance outstanding values. Inventoried or recommended classification to be maintained. | Each Federal agency is directed by Section 5(d)(1) of W&SR's Act to consider potential additions in respective planning processes. | Agencies apply somewhat similar criteria for eligibility and subsequent study. | As for designated rivers corridor 1/4 mile from o high water mark. |
| WILDERNESS AREAS | 1. Preserve and protect areas in their natural condition. 2. Scientific value as natural baselines, and for study of natural processes. 3. Gene reservoirs and refugia for certain species. 4. Benchmark to areas where impact of human management can be compared. 5. Provide opportunities for solitude or primitive, unconfined recreation. | Act of Congress. | Federal statute establishes framework, though agency interpretation and resultant management varies. | Statute defines at least acres; however, self-con smaller areas, e.g., Ore Islands at less than 7 a have been designated. |
| WILDERNESS STUDY AREAS | Montana (P.L. 95-150) - Maintain presently existing wilderness character and potential for inclusion in Wilderness Preservation System. RUTH, I DO NEED TO KNOW WHICH STATE IN R-4 AND THE PROTECTION PROVISION PROVIDED IN ENABLING LEGISLATION--THANKS! | Act of Congress. | Specific areas identified through Wilderness legislation. | Sized as described for Wilderness. |

THE PEOPLE

SENATE

ASSEMBLY

COMMITTEE ON

EDUCATION

REPORT

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COMMISSIONERS

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Table NATHAS. List of possible natural areas within Columbia River Basin.

| Designation | Objectives of allocation | Administrative level of allocation | Standardization across ownership | Range in size |
|--|--|---|---|---------------|
| NATURAL HERITAGE CONSERVATION AREA, OR | 1. To protect examples of terrestrial and aquatic ecosystems, and important geologic features; 2. to serve as gene pool reserves; 3. to serve as benchmarks against which the influences of human activity may be compared; 4. and to provide outdoor laboratories for research and education. | State Land Board, State Parks and Recreation Department, Department of Forestry, Department of Fish and Wildlife, Military Department, and Conservation Organizations. | Management direction should be consistent across agencies. | 600 ac |
| REGISTERED STATE NATURAL AREAS, OR | To acknowledge and list examples of relatively undisturbed terrestrial and aquatic ecosystems, rare plant and animal species, and unique geologic features. | Division of State Lands, Parks and Recreation Department, Department of Forestry, Department of Transportation, Department of Fish and Wildlife, local governments, and private landowners. | Direction not consistent across agencies. Private landowners not legally bound by this designation. | 50 - 3,000 ac |
| BIOLOGICAL STUDY AREAS, WA | 1. To protect examples of undisturbed terrestrial and aquatic ecosystems, rare plant and animal species, and unique geologic features; 2. to serve as gene pools reserves; 3. to serve as baselines against which the influences of human activities in similar, disturbed ecosystems may be compared; and 4. to provide outdoor laboratories for scientific research and education. | Washington State University and University of Washington. Potentially secure designation. | Not very many areas, managed in similar fashion. | 7 - 40 ac |

File # 100-100000

James Earl Ray

San Francisco

San Francisco

San Francisco

James Earl Ray, alias, was born January 19, 1928, in Glasgow, Scotland.

On May 1, 1968, James Earl Ray was arrested in London, England, on charges of kidnapping and murder.

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Table NATHAS. List of possible natural areas within Columbia River Basin.

| Designation | Objectives of allocation | Administrative level of allocation | Standardization across ownership | Range in size |
|---------------------------|---|---|--|-------------------------|
| HERITAGE AREA, WA | To preserve unique or geological, paleontological, archaeological, historical, scientific, and cultural features of the state which transcend local interest and are of statewide or national significance (WAC 3552-16-020(3)). | Washington State Parks and Recreation Commission. | Some variation in use and management. | No areas in CRB at this |
| NATURAL AREA, WA | To conserve a natural environment in a nearly undeveloped state for passive low density outdoor recreation activities. | Washington State Parks and Recreation Commission. | Some variation in use and management. | No areas in CRB at this |
| NATURAL FOREST AREA, WA | Designation of certain forest sites which are natural ecosystems for the preservation and interpretation of natural forest processed pursuant to RCW 43.51.045. These areas may contain old-growth forest communities, mature forest communities, or unusual forest communities (WAC 352-16-020(8)). | Washington State Parks and Recreation Commission. | Some variation in use and management. | No areas in CRB at this |
| NATURAL AREA PRESERVE, WA | 1. To protect examples of undisturbed terrestrial and aquatic ecosystems, rare plant and animal species, and unique geologic features; 2. to serve as gene pool reserves; 3. to serve as baselines against which the influences of human activities in similar, disturbed ecosystems may be compared; and 4. to provide outdoor laboratories for scientific research and education (RCW) 79.70.010. | Washington Department of Natural Resources, Washington State Parks and Recreation Commission, Washington Department of Fish and Wildlife. | Management generally consistent across administering agencies. | 35 - 3,000 ac |

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REPORT ON THE PROGRESS OF THE RESEARCH DURING THE YEAR 1964

1. *Introduction* 2. *Materials and Methods* 3. *Results* 4. *Discussion* 5. *Conclusions*

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The results of the experiments carried out during the year 1964 are presented in this report. The experiments were carried out in the laboratory of the Department of Biology, University of London, and the results are discussed in the following sections.

The first section of the report describes the materials and methods used in the experiments. The second section describes the results of the experiments, and the third section discusses the results in the context of the existing literature.

The results of the experiments carried out during the year 1964 are presented in this report. The experiments were carried out in the laboratory of the Department of Biology, University of London, and the results are discussed in the following sections.

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Table NATHAS2. Total area managed by Federal agencies in four western states, and area and percent in natural area designations. (Source: USGAO 1995)

| STATE | ACRES MANAGED (millions of hectares) | ACRES IN NATURAL AREAS (millions of hectares) | PERCENT IN NATURAL AREAS |
|------------|--|--|-----------------------------|
| Oregon | 12.99 | 2.87 | 22 |
| Washington | 4.69 | 1.94 | 41 |
| Idaho | 13.13 | 3.91 | 30 |
| Montana | 10.82 | 3.00 | 28 |

Table NATWAS. Total area managed by Federal agencies in four western states.
and area and percent in national forest designations. (Source: USFWS 1991)

| STATE | ACRES MANAGED (millions of acres) | ACRES IN NATIONAL FOREST (millions of acres) | PERCENT IN NATIONAL FOREST |
|------------|---|---|-------------------------------|
| Oregon | 12.82 | 2.81 | 22 |
| Washington | 4.62 | 1.22 | 41 |
| Idaho | 13.12 | 2.91 | 20 |
| Montana | 10.82 | 2.00 | 28 |

Table 1 (TAB. RANGE1, FILE TABRNGRE). Fire and fire management outcome for different vegetation types within the Intermountain West and associated areas. Prescribed fires are indicated by Rx in the "Fire?" column.

| LOCATION | HABITAT | DOMINANT SPECIES | FIRE? | MANAGEMENT OUTCOME | CITATION |
|------------------------------|-------------------|---|---------|--|------------------------------|
| Sheeprock Mts., UT | Pinyon - Juniper | <i>Pinus monophylla</i> <i>Juniperus osteosperma</i> | Yes | Succession in pinyon and juniper woodlands followed a general scheme of annuals to perennial grasses (5 years), to grasses and shrubs (35 years), to shrubs and juniper (70 years), and juniper - pinyon (+100 years). | Barney and Frischknecht 1974 |
| Needle Range, UT | Pinyon - Juniper | <i>Pinus monophylla</i> <i>Juniperus osteosperma</i> | Yes | Juniper established at a higher rate following fire than did pinyon. By 60 years post-fire, pinyon establishment was greater than juniper. | Tausch and West 1988 |
| White River Mts., NV | Pinyon - Juniper | <i>Pinus monophylla</i> <i>Juniperus osteosperma</i> | Yes, Rx | Prescribed fire impacted the pinyon-juniper woodlands differently, depending on season of burn, pre-burn community composition. | Everett and Ward 1984 |
| Great Basin, ID, NV, UT | Pinyon - Juniper | <i>Pinus monophylla</i> <i>Juniperus osteosperma</i> | No | Within pinyon-juniper woodlands, pinyon density was found to be increasing faster than juniper density. It was suggested that livestock grazing, tree utilization, and fire suppression may have interacted to influence the differences in density. | Tausch et al. 1981 |
| Upper Snake River Plains, ID | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Agropyron dasystachyum</i> <i>Stipa comata</i> <i>Poa</i> spp. <i>Carex</i> spp. | Yes, Rx | After 15 years, shrub cover was greatly reduced, while on the unburned areas had increased. Grass production was as much as or greater than on unburned areas. Forb production was also increased. | Blaisdell 1953 |
| | | | | 30 years following the prescribed burns, sagebrush had regained a dominant position in the communities, but had not reached the unburned level. Grass and forb yield declined as sagebrush increased. | Harniss and Murray 1973 |

| LOCATION | HABITAT | DOMINANT SPECIES | FIRE? | MANAGEMENT OUTCOME | CITATION |
|---|----------------------|--|-------|--|----------------------------|
| Northwest Yellowstone Nat. Park, WY | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Festuca idahoensis</i> | No | Lodgepole pine invading sagebrush communities. Invasion is thought to be the result of climatic change. | Patten 1963 Patten 1969 |
| Jackson Hole Area, northwestern WY | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Artemisia arbuscula</i> <i>Purshia tridentata</i> <i>Chrysothamnus</i> spp. Various grass species | No | Due to active fire suppression in the Jackson Hole area since the 1890's, lodgepole pine has invaded sagebrush communities, and sagebrush and other shrubs have increased. It is believed that recurrent fire kept shrub levels lower, and prevented conifer invasion. | Loope and Gruell 1973 |
| Owyhee Mts. ID | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Artemisia arbuscula</i> <i>Agropyron spicatum</i> <i>Festuca idahoensis</i> | No | Active fire suppression is believed to have allowed the invasion of juniper into the <i>Artemisia</i> dominated communities. Ancillary to fire suppression is grazing by domestic livestock and climatic changes. | Burkhardt and Tisdale 1976 |
| Idaho National Engineering Laboratory, southeastern ID | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Chrysothamnus viscidiflorus</i> <i>Leptodactylon pungens</i> <i>Gutierrezia sarothrae</i> <i>Sitanion hystrix</i> <i>Agropyron dasytachyum</i> <i>Oryzopsis hymenoides</i> <i>Stipa comata</i> | No | Over a disturbance-free period of 25 years, shrub and grass species increased in cover, but began a decline after 20 years. | Anderson and Holte 1981 |
| Galena Gulch, MT | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Festuca idahoensis</i> <i>Festuca scabrella</i> | No | The historic fire frequency favored the species of the shrub-grassland. With fire suppression, invasion of <i>Pseudotsuga menziesii</i> and <i>Pinus contorta</i> into the shrub-grasslands has occurred. | Arno and Gruell 1986 |

| LOCATION | HABITAT | DOMINANT SPECIES | FIRE? | MANAGEMENT OUTCOME | CITATION |
|---------------------------|------------------------------------|---|---------|--|-----------------------------|
| Gallatin Nat. For. MT | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Artemisia cana</i> <i>Danthonia unispicata</i> <i>Bromus marginatus</i> | Yes, Rx | A spring prescribed burn resulted in decreases in sagebrush and smooth brome (<i>Bromus marginatus</i>); an increase occurred for danthonia (<i>Danthonia unispicata</i>). | Nimir and Payne 1978 |
| Southwestern MT | Sagebrush - grass - forest ecotone | <i>Artemisia tridentata</i> <i>Agropyron spicatum</i> <i>Festuca idahoensis</i> | No | Suppression of fires is believed to be responsible for the encroachment of conifers into the sagebrush grasslands, and also the increase in density of sagebrush in these areas. | Arno and Gruell 1983 |
| East-central NV | Sagebrush - grass | <i>Artemisia nova</i> | No | Invasion by pinyon pine and juniper into black sagebrush communities has been occurring since 1869. Overgrazing, fire suppression, and change in climate have been proposed as factors in the invasion process. | Blackburn and Tueller 1970. |
| Northwestern NV | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Stipa thurberiana</i> <i>Bromus tectorum</i> | Yes | The first year following the wildfires, both perennial and annual species were reduced. By the second year post-fire, the areas became dominated by cheatgrass, which prevented seedling establishment of native species. | Young and Evans 1978 |
| Southern British Columbia | Sagebrush - grass | <i>Artemisia tridentata</i> <i>Agropyron spicatum</i> | No | It is believed that recurrent fire maintained sagebrush at low densities prior to settlement by immigrants. With fire suppression, sagebrush densities have increased. | Cawker 1983 |
| Hanford Nuclear Res., WA | Bitterbrush - cheatgrass | <i>Purshia tridentata</i> <i>Bromus tectorum</i> | Yes | The first year following wildfire, cheatgrass production was very low. By the fifth year post-fire, production was similar on burned and unburned sites. Bitterbrush was removed from the site, and there was no evidence of re-establishment. | Rickard and Sauer 1982 |

| LOCATION | HABITAT | DOMINANT SPECIES | FIRE? | MANAGEMENT OUTCOME | CITATION |
|--------------------------------|-------------------|---|-------|--|-------------------------|
| Devils Tower Nat. Monument, WY | Savanna - prairie | Shrub and grass species | No | The fire history of this area indicates an historical fire return period (FRP) of 14 years. Currently, the area has a much longer FRP, which has resulted in the invasion of the savanna and prairie communities by ponderosa pine. | Fisher et al. 1987 |
| Glacier Nat. Park, MT | Grassland | <i>Agropyron spicatum</i> <i>Festuca idahoensis</i> <i>Festuca scabrella</i> <i>Danthonia intermedia</i> | No | These grasslands are thought to have developed and be maintained through the interactions of climate, soils, and fire. Fire suppression in the park, since 1910, has resulted in the invasion of lodgepole pine into the grasslands. | Koterba and Habeck 1971 |
| Southeastern WA | Grassland | <i>Agropyron spicatum</i> <i>Poa secunda</i> <i>Chrysothamnus nauseosus</i> <i>Bromus tectorum</i> | Yes | Fire resulted in a change in balance between the two dominant grass species, with <i>Poa</i> becoming the dominant. Preburn levels were attained after 12 years. Cheatgrass levels attained preburn level by the second year. Rabbitbrush was completely eliminated, in part due to heavy insect herbivory prior to the fire. | Daubenmire 1975 |
| Mt. Sentinel, MT | Grassland | <i>Festuca scabrella</i> <i>Festuca idahoensis</i> <i>Agropyron spicatum</i> | Yes | Active fire suppression allowed the encroachment of ponderosa pine and Douglas fir into the more mesic areas of the grassland. Three years following a wildfire, cover of most species was similar in both burned and unburned areas, fescue was slightly lower on burned areas. | Antos et al. 1983 |

| LOCATION | HABITAT | DOMINANT SPECIES | FIRE? | MANAGEMENT OUTCOME | CITATION |
|-----------------------------------|------------------|--|-------|---|--|
| Cascades of OR and WA | Subalpine meadow | <i>Phyllodoce empetrifomis</i> / <i>Vaccinium deliciosum</i> | No | High conifer invasion | Franklin et al. 1971 |
| | | <i>Valeriana sitchensis</i> | | Low conifer invasion | |
| | | <i>Festuca viridula</i> | | Low conifer invasion | |
| | | <i>Potentilla flabellifolia</i> | | High conifer invasion | |
| | | | | Change in climate, resulting in a longer snow-free period, is suggested as the driving force of the invasions. | |
| Calispell Peak, northeast WA | Subalpine meadow | <i>Artemisia tridentata</i> <i>Agropyron spicatum</i> <i>Abies lasiocarpa</i> | No | Trees occur in swales with deeper soils and low stone content Sagebrush/grass occurs on mounds with deeper soils and low stone content Grasses occur in intermountain areas with shallow, stoney soils. | Roche and Busacca 1987 |
| Cascades, central and southern OR | Montane meadow | <i>Rubus parviflorus</i> / <i>Pteridium aquilinum</i> <i>Bromus carinatus</i> / <i>Rudbeckia occidentalis</i> | No | Invasion of meadows by various conifer species depending on the surrounding forest. Fires were believed to be the dominant force in maintaining the meadows. | Vale 1981 |
| Southern Sierra Nevada, CA | Subalpine meadow | <i>Carex scopulorum</i> <i>Carex rostrata</i> <i>Deschampsia caespitosa</i> | Yes | First year post-fire, area dominated by forbs, some lodgepole pine invading the meadow were killed; after 4 years, returning towards pre-fire community, tree encroachment slowed. | DeBenedetti and Parsons 1979 Parsons 1981 DeBenedetti and Parsons 1984 |

| LOCATION | HABITAT | DOMINANT SPECIES | FIRE? | MANAGEMENT OUTCOME | CITATION |
|---------------------------|----------------------------------|--|-------|--|------------------------|
| Lemhi Mts., ID | Subalpine meadows | <i>Festuca ovina</i> <i>Festuca idahoensis</i> <i>Poa secunda</i> <i>Artemisia</i> spp. | No | Most conifer invasion occurred between 1895-1915 and again between 1920-1940. Several factors are suggested as driving the invasions: climate change, fire history, and grazing pressures. | Butler 1986 |
| Yellowstone Nat. Park, WY | Subalpine meadows: dry and mesic | Dry: <i>Artemisia tridentata</i> <i>Artemisia cana</i> <i>Carex</i> spp. <i>Muhlenbergia</i> spp. <i>Achillea millefolium</i> Mesic: <i>Carex</i> spp. <i>Antennaria carymbosa</i> <i>Potentilla gracilis</i> <i>Deschampsia caespitosa</i> <i>Phleum alpinum</i> | No | Conifer encroachment is suggested to be due to climatic variability in the dry meadows, and due to episodic seed production and microhabitat changes in mesic meadows. | Jakubos and Romme 1993 |

Table TABRNGSO. Soil Susceptibility to Disturbance Stresses (hectares)

| ERU ¹ | K Factor (mod.) | WEG (mod.) | Salinity (mod.) | SAR (severe) | SAR (mod.) | Shrink- Swell (mod.) |
|------------------|--------------------|---------------|--------------------|-----------------|---------------|----------------------------|
| 1. | 136915 | 496252 | 3352 | | | |
| 2. | 28226 | 1826 | | | | 1826 |
| 3. | | 373926 | 99877 | | | 83055 |
| 4. | 139255 | 2710595 | 496014 | | | 614131 |
| 5. | 3141189 | 3660856 | 514628 | | | 480221 |
| 6. | 245564 | 2306457 | 77262 | | | 596935 |
| 7. | 370109 | 3071161 | 29448 | | | |
| 8. | 90730 | 1543431 | | | | |
| 9. | 159398 | 1336702 | | 1711 | 1711 | 3066 |
| 10. | 1045316 | 5197317 | 1147419 | 5544 | 15863 | 1145886 |
| 11. | 949074 | 963937 | 1190722 | | 20942 | 73315 |
| 12. | 277540 | 995584 | 32024 | | | 1632 |
| 13. | 96051 | 2132411 | 372039 | | | 47225 |

¹ERU's (Ecological Reporting Units): 1. Northern Cascades, 2. Southern Cascades, 3. Upper Klamath, 4. Northern Great Basin, 5. Columbia Plateau, 6. Blue Mountains, 7. Northern Glaciated Mountains. 8. Lower Clark Fork, 9. Upper Clark Fork, 10. Owyhee Uplands, 11. Upper Snake, 12. Snake Headwaters, 13. Central Idaho Mountains

To: Cindy Dean, ICBEMP Office, Walla Walla WA

CC:

From: bruce marcot

Date: April 11, 1996

Re: Tribal Vertebrates of Interest

APR 15 1996
RECEIVED

memo

Cindy,

Would you kindly add this table to the "on file" folder material for the Terrestrial Ecology Staff, SIT (the material I had entitled: "Information On File as Cited in the Terrestrial Ecology Assessment Chapter, Science Integration Team Report, Interior Columbia Basin Ecosystem Management Project").

Thanks.

I've sent a copy of this new table to the EIS teams.

- b.

from the desk of...

bruce marcot
wildlife ecologist
usda forest service
333 sw 1st st
portland or 97208

503/326-4952
Fax: 503/326-2455

Table TRIBVERT. The 71 vertebrate species considered by the Science Integration Team as important to American Indian tribes in the assessment area. Class: R = reptile, B = bird, M = mammal (no amphibians were included in this list).

| Class | Family | Scientific name | Common name |
|-------|--------------|-------------------------------|-----------------------------------|
| B | ACCIPITRIDAE | AQUILA CHRYSÆTOS | GOLDEN EAGLE |
| B | ACCIPITRIDAE | BUTEO JAMAICENSIS | RED-TAILED HAWK |
| B | ACCIPITRIDAE | BUTEO REGALIS | FERRUGINOUS HAWK |
| B | ACCIPITRIDAE | HALIAEETUS LEUCOCEPHALUS | BALD EAGLE |
| B | ACCIPITRIDAE | PANDION HALIAETUS | OSPREY |
| B | ANATIDAE | BRANTA CANADENSIS | CANADA GOOSE |
| B | ANATIDAE | CYGNUS BUCCINATOR | TRUMPETER SWAN |
| B | ANATIDAE | CYGNUS COLUMBIANUS | TUNDRA SWAN |
| B | ANATIDAE | MERGUS MERGANSER | COMMON MERGANSER |
| B | COLUMBIDAE | ZENaida MACROURA | MOURNING DOVE |
| B | CORVIDAE | CORVUS CORAX | COMMON RAVEN |
| B | EMBERIZIDAE | ICTERUS GALBULA | NORTHERN ORIOLE |
| B | EMBERIZIDAE | ICTERUS PARISORUM | SCOTT'S ORIOLE |
| B | EMBERIZIDAE | STURNELLA NEGLECTA | WESTERN MEADOWLARK |
| B | FALCONIDAE | FALCO MEXICANUS | PRAIRIE FALCON |
| B | FALCONIDAE | FALCO SPARVERIUS | AMERICAN KESTREL |
| B | HIRUNDINIDAE | HIRUNDO PYRRHONOTA | CLIFF SWALLOW |
| B | HIRUNDINIDAE | HIRUNDO RUSTICA | BARN SWALLOW |
| B | HIRUNDINIDAE | PROGNE SUBIS | PURPLE MARTIN |
| B | HIRUNDINIDAE | RIPARIA RIPARIA | BANK SWALLOW |
| B | HIRUNDINIDAE | STELGIDOPTERYX SERRIPENNIS | NORTHERN ROUGH- WINGED SWALLOW |
| B | HIRUNDINIDAE | TACHYCINETA BICOLOR | TREE SWALLOW |
| B | HIRUNDINIDAE | TACHYCINETA THALASSINA | VIOLET-GREEN SWALLOW |

| Class | Family | Scientific name | Common name |
|-------|----------------|--------------------------------------|-------------------------------|
| B | MIMIDAE | MIMUS POLYGLOTTOS | NORTHERN MOCKINGBIRD |
| B | MUSCICAPIDAE | TURDUS MIGRATORIUS | AMERICAN ROBIN |
| B | PHASIANIDAE | BONASA UMBELLUS | RUFFED GROUSE |
| B | PHASIANIDAE | CENTROCERCUS UROPHASIANUS | SAGE GROUSE |
| B | PHASIANIDAE | DENDRAGAPUS CANADENSIS | SPRUCE GROUSE |
| B | PHASIANIDAE | DENDRAGAPUS OBSCURUS | BLUE GROUSE |
| B | PHASIANIDAE | TYMPANUCHUS PHASIANELLUS COLUMBIANUS | COLUMBIAN SHARP-TAILED GROUSE |
| B | PICIDAE | COLAPTES AURATUS | NORTHERN FLICKER |
| B | RALLIDAE | FULICA AMERICANA | AMERICAN COOT |
| B | STRIGIDAE | OTUS KENNICOTTII | WESTERN SCREECH OWL |
| B | TROGLODYTIDAE | CATHERPES MEXICANUS | CANYON WREN |
| M | ANTILOCAPRIDAE | ANTILOCAPRA AMERICANA | PRONGHORN |
| M | BOVIDAE | BOS BISON | AMERICAN BISON |
| M | BOVIDAE | OREAMNOS AMERICANUS | MOUNTAIN GOAT |
| M | BOVIDAE | OVIS CANADENSIS CALIFORNIANA | CALIFORNIA BIGHORN SHEEP |
| M | BOVIDAE | OVIS CANADENSIS CANADENSIS | ROCKY MOUNTAIN BIGHORN SHEEP |
| M | CASTORIDAE | CASTOR CANADENSIS | BEAVER |
| M | CERVIDAE | ALCES ALCES | MOOSE |
| M | CERVIDAE | CERVUS ELAPHUS NELSONII | ROCKY MOUNTAIN ELK |
| M | CERVIDAE | ODOCOILEUS HEMIONUS | MULE DEER |
| M | CERVIDAE | ODOCOILEUS HEMIONUS COLUMBIANUS | BLACK-TAILED DEER |

| Class | Family | Scientific name | Common name |
|-------|-------------|-------------------------|--------------------------------|
| M | CERVIDAE | ODOCOILEUS VIRGINIANUS | WHITE-TAILED DEER |
| M | FELIDAE | FELIS CONCOLOR | MOUNTAIN LION |
| M | FELIDAE | LYNX RUFUS | BOBCAT |
| M | LEPORIDAE | BRACHYLAGUS IDAHOENSIS | PYGMY RABBIT |
| M | LEPORIDAE | LEPUS AMERICANUS | SNOWSHOE HARE |
| M | LEPORIDAE | LEPUS CALIFORNICUS | BLACK-TAILED JACKRABBIT |
| M | LEPORIDAE | LEPUS TOWNSENDII | WHITE-TAILED JACKRABBIT |
| M | LEPORIDAE | SYLVILAGUS NUTTALLII | MOUNTAIN COTTONTAIL |
| M | MURIDAE | NEOTOMA LEPIDA | DESERT WOODRAT |
| M | MURIDAE | ONDATRA ZIBETHICUS | COMMON MUSKRAT |
| M | MUSTELIDAE | LUTRA CANADENSIS | NORTHERN RIVER OTTER |
| M | MUSTELIDAE | TAXIDEA TAXUS | AMERICAN BADGER |
| M | OCHOTONIDAE | OCHOTONA PRINCEPS | AMERICAN PIKA |
| M | SCIURIDAE | MARMOTA FLAVIVENTRIS | YELLOW-BELLIED MARMOT |
| M | SCIURIDAE | SPERMOPHILUS LATERALIS | GOLDEN-MANTLED GROUND SQUIRREL |
| M | SCIURIDAE | SPERMOPHILUS TOWNSENDII | TOWNSEND'S GROUND SQUIRREL |
| M | SCIURIDAE | TAMIAS AMOENUS | YELLOW-PINE CHIPMUNK |
| M | SCIURIDAE | TAMIAS DORSALIS | CLIFF CHIPMUNK |
| M | SCIURIDAE | TAMIAS MINIMUS | LEAST CHIPMUNK |
| M | SCIURIDAE | TAMIAS RUFICAUDUS | RED-TAILED CHIPMUNK |
| M | SCIURIDAE | TAMIAS UMBRINUS | UINTA CHIPMUNK |
| M | SCIURIDAE | TAMIASCIURUS DOUGLASII | DOUGLAS' SQUIRREL |

| Class | Family | Scientific name | Common name |
|-------|------------|----------------------------|----------------------------------|
| M | CARVIDAE | ONCHOMELUS VINGENIENSIS | WHITE-TAILED DEER |
| M | VELIDAE | PETA GYALLOS | MOUNTAIN LION |
| M | VELIDAE | LYNX RUPE | BOBCAT |
| M | LEPORIDAE | BRACHYLAIMA BRACHYOTIS | TYGMY RABBIT |
| M | LEPORIDAE | LEPUS AMERICANUS | SNOWSHOE HARE |
| M | LEPORIDAE | LEPUS CALIFORNICUS | BLACK-TAILED JACKRABBIT |
| M | LEPORIDAE | LEPUS TOWNSENDII | WHITE-TAILED JACKRABBIT |
| M | LEPORIDAE | SYLVILAGUS MUTTALLI | MOUNTAIN COTTONTAIL |
| M | MURIDAE | NEOTOMA LEPTA | DESERT WOODRAT |
| M | MURIDAE | OMODONTA ZIBETHICUS | COMMON MUSKRAT |
| M | MUSTELIDAE | LUTRA CANADENSIS | NORTHERN RIVER OTTER |
| M | MUSTELIDAE | TAXIDEA TAXIS | AMERICAN BADGER |
| M | OGOTONIDAE | OGOTONA PRINCIPS | AMERICAN BEA |
| M | SCIURIDAE | MAIMOTA FLAVIVENTRIS | YELLOW-BELLIED MARMOT |
| M | SCIURIDAE | SPERMOPHILUS LATERALIS | GOLDEN-MANTLED GROUND SQUIREL |
| M | SCIURIDAE | SPERMOPHILUS TOWNSENDII | TOWNSEND'S GROUND SQUIREL |
| M | SCIURIDAE | TAMIAS AMOENUS | YELLOW-PINE CHIPMUNK |
| M | SCIURIDAE | TAMIAS DORSALIS | CUTT CHIPMUNK |
| M | SCIURIDAE | TAMIAS MINIMUS | LEAST CHIPMUNK |
| M | SCIURIDAE | TAMIAS RUFOCAUDUS | RED-TAILED CHIPMUNK |
| M | SCIURIDAE | TAMIAS UMBRINUS | VINTA CHIPMUNK |
| M | SCIURIDAE | TAMIASCIURUS DOUGLASSII | DOUGLAS'S SQUIREL |

| Class | Family | Scientific name | Common name |
|-------|-----------|----------------------------|---------------------|
| M | SCIURIDAE | TAMIASCIURUS HUDSONICUS | RED SQUIRREL |
| M | URSIDAE | URSUS AMERICANUS | BLACK BEAR |
| M | URSIDAE | URSUS ARCTOS | GRIZZLY BEAR |
| R | IGUANIDAE | PHRYNOSOMA DOUGLASSII | SHORT-HORNED LIZARD |
| R | VIPERIDAE | CROTALUS VIRIDIS | WESTERN RATTLESNAKE |

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| R | ICHTHYURAE | PHRYNOSOMA DOUGLASSII | SHORT-HORNED LIZARD |
| M | URSIDAE | URUS ARCTOS | GRIZZLY BEAR |
| M | URSIDAE | URUS AMERICANUS | BLACK BEAR |
| M | SCURIDAE | TAMIASCIURUS HYDROMYCHUS | RED SQUIRREL |
| | | | COMMON MARMOT |

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